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A SELECTIVE MICROFILM EDITION

PART II: (1879–1886)

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Thomas A. Edison Papers

at Rutgers, The State University endorsed by

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THOMAS A. EDISON PAPERS A SELECTIVE MICROFILM EDITION PART II (1879–1886)

REEL 96

COMPANY RECORDS SERIES (COM-I)

COMPANY RECORDS SERIES

- Two sets of documents comprise the Company Records Series for 1879-1886: (1) Primary Printed Collection; (2) Miscellaneous Company Records.
- (1) <u>Primary Printed Collection</u>. This collection contains printed documents that were issued by the various Edison companies and their competitors. Most of that were spaced by the various common companies and their competitors, most or the items are advertising circulars, promotional brochures, and instruction manuals. A few other items such as annual reports, company bylaws, and incorporation papers are also included. All of the printed material issued by the Edison companies has been fillmed except for duplicate copies of selected documents.
- (2) <u>Miscellaneous Company Records</u>. This collection consists primarily of minute books, bulletins, canvass books, and other bound items relating to the arrious Edison companies. Included among the documents for 1879-1886 are extensive runs of the bulletins issued by the Edison Electric Light Company and the Edison Company for Isolated Lighting.

The documents appear on the microfilm in the following order:

PRIMARY PRINTED COLLECTION Electric Light Companies - Domestic

- 1. Edison Electric Light Company
- 2. Edison Company for Isolated Lighting
- 3. Edison Electric Illuminating Company of Brockton
- 4. Edison Electric Illuminating Company of New York
- 5. Western Edison Light Company

Electric Light Companies - Foreign

- 1. Edison Electric Light Company of Europe, Ltd.
- 2. Compagnie Continentale Edison
- 3. Societe Electrique Edison
- 4. Societe Industrielle & Commerciale Edison
- 5. Deutsche Edison Gesellschaft

South America

Compania Electrica de Edison

C. Other Companies

- 1. Edison Phonoplex System
- 2. Edlson Speaking Phonograph Company
- 3. Edison Telephone Exchanges
- 4. Gold and Stock Telegraph Company 5. Menlo Park Manufacturing Company
- 6. Sims-Edison Electric Torpedo Company
- 7. United Telephone Company, Ltd.

MISCELLANEOUS COMPANY RECORDS

- A. Electric Light Companies Domestic

 - Edison Electric Light Company [bulletins]
 Edison Company for Isolated Lighting [bulletins]
 Edison Electric Illuminating Company of Boston [finding ald to microfilmed collection of letterbooks and other records]
 - 4. Thomas A. Edison Construction Department [instruction books, engineering plans, canvass books, other records]
- B. Electric Light Companies Foreign

 - Edison Electric Light Company of Europe, Ltd. [scrapbook]
 Edison Electric Light Company, Ltd. [agreements, incorporation papers, lists of stockholders]
- C. Other Companies

 - Edison Ore Milling Company, Ltd. [minute book]
 Edison Telephone Company of Europe, Ltd. [minute book, stock certificate book, stock transfer book]

Edison Electric Light Company

This folder contains printed material issued by the Edison Electric Light Company. This company was established in late 1878 to provide Edison with funds Company. Inis company was established in late 18/8 to provise exists with lunds for his experiments in electric lighting in return for control of any patents he might receive in this field. The company licensed these patents to subsidiary companies like the Edison Machine Works and Edison Electric Illuminating Company of New York. These manufacturing and operating companies built and sold electrical equipment and constructed central stations, while paying royalties to the Edison Electric Light Company.

The following items have been filmed:

- Annual Report (1885) Annual Report (1886)
- 2.
- 3. "The Edison Central Station System" [second edition] (1885)
- Central Station Catalog (1886) Testimonial from the Laramie Electric Light Company (1886)

The following items have not been filmed:

- "The Edison Central Station System" [first edition] (1884?)
 "The Edison Electric Light Meter" [This pamphlet also appears as an enclosure to a letter from Francis Jehl to Edison, May 11, 1882, D-82-039 (Document File Series).]

NELL LT . 4 El. LT. G. Kepert. 12-147 851027

THE EDISON ELECTRIC LIGHT

COMPANY.

REPORT

BOARD OF TRUSTEES

STOCKHOLDERS,

ANNUAL MEETING,

OCTOBER 27m,

1885.

BOARD OF TRUSTEES.

EDWARD D. ADAMS, CHARLES BATCHELOR, EUGENE CROWELL, CHARLES H. COSTER,

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T. A. EDISON, F. S. HASTINGS, EDWARD H. JOHNSON,

CHARLES H. COSTER, R. L. CUTTING, JR., A. F. HIGGINS, SPENCER TRASK, F. R. UPTON, ERASTUS WIMAN,

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OFFICERS.

EUGENE CROWELL, President.

EDWARD H. JOHNSON, Vice-President,

H. JOHNSON, Vice-President,
F. S. HASTINGS, Sacretary and Treasurer.

GENERAL OFFICES, 65 Fifth Avenue, New York City.

To the Stockholders of

The Edison Electric Light Company:

Since the last annual report of your Trusteee, your Company has passed through an important and gratifying year, and at its close the outlook for a preoperous future is clearer and reets on a better foundation than at any time in its history.

The predictions made in past years that the Edison Light had come to stay have been amply verified, and each oucceeive year shows more conclusively its superiority over other present known methods of artificial illumination, and proves that it is able to stand the test of time.

The first isolated dynamo sold by your company was started Maye 1,880, and the face construct elation, that of Now York, Sept. 4, 1889. In these, no in all subsequent installations of isolated and central elation plants, The Belloom Light has gained favor, and is now more popular with those who uses it than when the light was refut turned on. Light bits a remarkable fact that the plant above referred to an indigent the control of the plant of the plant of the plant of being the first is solated installation, is in prefer two real being the first is solated installation, is in prefer two many order to-day, although marked changes and imprevenents have been said of its manufacture of our dynamos and electrical appliances, as well as in our general cystem of electric lighting climes that time.

All of our various interests have associated with them the heet obtainable electrical and mechanical engineers, whose aim has been to cimplify and cheapen our cystem of electric lighting, and as a result of this combined experience and effort, little remains to be desired in our system of central station and isolated lighting of to-day.

During the year, 14 central etation companies have been organized, viz. Harrisburg, Pa., Doe Moines, Ia, York, Pa., West Chester, Pa., Tuanagan, Pa., Moßcosport, Pa., New Brunswick, N. J., Wilmington, Del., Boone, Ia., Johnstown, Pa., New Bedford, Mass, Leckport, N. Y., Little Palls, N. Y., Jackson, Mich.

There are now 31 central station plants in operation or in course of installation in the United States, a complete list of which is given below:

LOCATION.	CAPITAL	LAMP CAPACITY.
Now York City	\$1,000,000	18,000
Lawrence, Mass	05.000	8,200
	05.000	4.000
Foli River. "	99,000	8,080
Nowburgh, N. Y	45,000	1.000
Shomokin, Pa	27,000	2,400
Sunbury, Pa	20,000	500
Hozleton, Pn	25,000	1,000
Williamsport, Pa	100,000	1,600
Harrisburg, Pa	100,000	5,000
Bellefonte, Po	10,000	800
Ashlond, Pa	20,000	1.000
Appleton, Wis	25,000	800
Cumberland, Md	50.000	1.000
Piqua, Ohio	40,000	1,000
Middletown, Ohio	20,000	1,000
Pillin, Ohlo	40,000	1.000
Direloviile, Ohio	30,000	1,000
Des Moines, Iown	80,000	8.800
West Chester, Po	80,000	1,500
New Bedford, Moss	60.000	2,000
McKeesport, Pa	100,000	1,600
Pomoguo, Pa	50,000	1,600
Now Brunswick, N. J.	50,000	1,000
York, Pa	00,000	1,600
Wilmington, Del		1,600
Boone, Ia		1,000
Johnstown, Pn		2,000
Cookport N V		400
Loekport, N. Y		500
Jackson, Mich		500
menapai ancumininininininininininininininininininin	.,	- 000
Total Lamp Capoeity		

The places marked * have underground conductors: the others have pelo lines.

The Editon Electric Illuminating Company, of New York, has been carning, for the six monthe ending Gotober 1st (which are all aummer months), at the rate of four and a half per cent. per annum, and on August 1st of the present year, path a first quarterly divided of 15½ to its stockholders, and another of like amount has been declared for the quarter ending November 1st. This company is now on a firm financial footing, reached under extraordinary difficulties.

As stated in our last annual report, this was the plones control action, and like most pionese enterprises, it was subjected to peculiar difficulties at almost every point. The most sections of them was, of course, the great cost of installing the plant, wideh was of air inexcess of the every impelled estimates which could then be made, that the entire resources of the company were not only consumed, but it was left with a heavy floating debt, to embarrase it in its operations. It is peculiarly gratifying, therefore, to be able to state that the company has at last succeeded in in its operations. It is peculiarly gratifying therefore, to be able to state that the company has at last succeeded in discharging that debt, and is now paying moderate and regular dividends, with a certainty of increasing them as soon as the connective of the station is enharmed.

The following extmet from the letter of the Treasurer of the Illuminating Co. of New York, dated July 17, 1885, to its stockholders, announcing the quarterly dividend, the same being an extract from the minutes of the Company, will show its position to be a strong one:

[&]quot;The president then exhibited a detolicd report of the earnings and expenses of the company, showing that the nat cornings for the six months ending June 30, 1889, after poying all expenses of every description, were \$55,000,00."

[&]quot;The president further stated then the Company is absolutely recorded footing date if any kind, the debt insured in leverants; and supposity of the Pend Street Staten having been entirely paid from each state such payment, and after payment of all entering the counts for current supplies, &c., there remained from earnings, a sum of \$10,039.40 cash on hand applicable to dividend

"Proporturities information, Imagination that the law gambling continues of the control time Company and the Billions Sector Light Company and the Billions Sector Light Company in the control time of the co

Your Truston deem it a matter for congranisation that the colaim of the Illiministing Co. of New York, against your Company, have been amicably settled as above stated, by the surveader of part of the otech of the Illiministing Co., herestore hold by your Company, and the stock thus surrendered has been placed in the hands of three treathers, the trust deed providing that part or all of it may be used as an aid in security the necessary funder for an uptown station.

The Trust deed further provides that in case the Illuminating Company does not within one your, from July 1, 1885, succeed in obtaining the sum of \$500,000, and proceed with the installation of an uptown district, 1,000 ahores of the ouid dook shall revert to your Company, and in the event of the Illuminating Company succeeding in raising the aboves must of \$500,000, your Company is to receive \$125,000 of the increased capital, in payment of licence for the new district.

The time has certainly come when another district should be occupied in New York. Careful and reliable estimates based on the results achieved by the down town district, show that a district installed approon, with all the latest improvements, with present decreased cost of installing and operating, and in a location which is conceted to be much better lighting than the down town district, would return very handsome divideads from the deart. These is every indication that the money will be raised early this winter, and with the assistance given by the trust stock, before alluded to, your Trustees believe that success is assured.

The offect on the business of your Company of a second district in New York can searcely be overestimated. It would, without doubt, give an impetus to the establishing of similar districts in other large eities, and be a wonderful etimules to central station lighting throughout the country.

One of the most satisfactory of your licensec companies is that of Harricourg, Pa. This plant has been recently comploted, and the plan of construction as well as its perfect working is the admiration of all who see it.

An extract from the New York "Electrical Review," of June 20, 1885, relating to this plant, will be of interest:

"This company has been in operation about three months, and it reported to be an dividend-paying hasts from the start, a rather measured thing. It generally taken age company a year to get their hustness on paying business, and this has heretofore been the result with starting Contract Blocketic Light Stations on the isometiscent system. It has generally taken a long time to get ensember to pay for wiring their stores, but this Company Appled another rule.

"Troy lave paid for all the writing themselves, simply requiring a contrest for a year at so much a hump, payable meatily. The overage charge is severely-dree costs for a lawn (of statem candle power) a south, and the system is so possible that every hump of their present experity (2,600) is sold, and they have decided to enlarge their works. They have smooth their measures the logistic of the other Capital at \$1,500 a month the electromagness the logistic of the other Capital at \$1,500 a month the electromagness the logistic of the other Capital at \$1,500 a month the theorems twelve botch, large and small. These have all discarded gas all over the house and use notifies that tendencector lightly.

"These lamps can be lighted at any time of the day or night, as the engines are obveys at work. What few acceptions the Edited names of fitted to the old gas fixtures, and the average expenses to the company of exost of whitegla have bosen about \$2,0.0 per lamp. The pepularity of the now light is so strong lust without exception all the meers have taken out their gas meters.

"In Harrisburg the wires ere all overhead and a better working station cannot be found in this country. The electric light station is one of the best over erected and situated among residences close to the State House, it is an ornament to the street and city.

it is an ornament to the street and ofty.

"It will pay any one interested in the success of lacandescent lighting to visit flarrishurg and see the plant is aperation."

Since the above was published the Harrisburg Company has inereased the capacity of its station to 5,600 lights. They state that they are already carning over worthy-fave parcent, on their capital stock, and expect to do still botter.

The foregoing statement regarding Harrisburg is not in any way exceptional, and only fairly illustrates the great progress that has been made during the past two years in perfecting our central station eyetem, not only electrically, but also commercially. In fact, it is from the commercial etandpoint that the greatest progress has been made, for while the efficiency of our plant and method of inetallation, as adopted to-day, are in every way vastly superior to our earlier work, these facts in themselves would not be sufficient to culist capital in this most important branch of our business. Your Cempany has therefore striven earnestly to improve and develop the methods of central station installation on a sound dividend-paying basic, and it can now be stated omphatically that all our installations of the past year or mere have proven to be profitable outerprices. The faults, electrical and financial, which characterized our installatione of three or four years ngo, are now happily things of the past; and with two or three exceptions, even these earlier installations have developed into prosperous and dividend-earning companies. In some cases, to bring thie about, reasonable concessions have been made by your Company, and the wisdom of such a course must be so apparent that your Beard does not desm any extended comment or explanation necessary. These concessions have been largest towards our Ohio Companies, which have been engaged in a hard struggle, forced upon tham by the local gas companies, who evidently thought they could easily crush out electric lighting in their respective neighborhoods. The result, however, has been exactly opposite to such anticipations, and in one cass, already, the gas company has succumbed, and the Electric Company now controls the business.

The most important event of the past year has been the bringing of suits at law by your Company against the principal infringere of your lamp and other patents.

The specificacy of laringing each easits was engagested in the last annual laport, and as subsequent events confirmed the fact that longer delay would be impreadent, steps were taken to bring immediate actions against the infringers. We are now able to report that on Way 2, bills of complaint were filled against the United States Electric Lighting Con, The Connollidated Electric Light Co., The Swan Londdescent Electric Lighting Co., and a number of consumers of light furnished by companies infringing your petants.

Great injury ie being done your Company and all its licensees, by these infringers on Mr. Editors is idaes and invantions, all of which we believe to be fully protected by your patents, and your Board are resolved to vigorously presecute and stamp out all infringements, and to each the sid of the Courte in maintaining the patents that belong exclusively to you by priority of invention and richt.

The survices of Hon. Wm. M. Evarte have been excured a sulvisory council; and Mossen. J. C. Yomilson-and R. N. Dyes have been engaged to earry on the active preparation and prescention of the seits. We believe that with these gentlemen your patent matters are in good hands, and to a microscatal lissue as expeditionely seposatible. Our colinions of the value of the second to the survival of the second to t

The many voxed questions arising out of past business transactions between your Company, Mr. Edison, and the various shops, as well as certain claims of Mr. Edison under hie contract with thie Company, were made the subject of investigation by a special committee appointed by the Board and the result has been a settlement of these long pending differences by mutual compromises in a manner satisfactory to all the partice concerned. Under Mr. Edicon's interpretation of hie contract your Company would have been ohliged to pay him the sum of \$100,000 in each; but against such payment various reasone and effsete were nrged and the matter was finally settled by allowing as due to Mr. Edison the eum of \$66,755.70 with provision however that came shall not be called for until euch time as your Company shall reach a dividend-paying basis. It is hut just to Mr. Edison that your Board should hear testimony to the spirit of fairness which he displayed in the settlement of these vexations questions which are new so happily adjusted.

An agreement has been made with the Sprague Motor Company allewing them to ass several of one break and armature patents in connection with their motor, thereby increasing the efficiency of the latter. As consideration for this privilege, the Motor Company agree to pay a royally of 3% on the value of all meters seld to your licenses comnaises within their territory. This armagement will beautifully your Company by increasing the carning capacity of the licenses companies in which year are shockholdors.

Reference was made in the last annual report to the arrangement made by your Company with the Edison Co. for Lichtited Lighting, whereby the latter assumed the direction of the cauvassing and exploitation of central station business. As explained in the last report, the Isolated Company was already provided with an efficient corps of agents and electrical engineers quite adequate to carry on this work in connection with the isolated and village plant lunciness conceded to them under their original contract with your Company. By the the transfer of this part of our husiness to them, your Company is relieved of the necessity and responsibility of carrying a department of trained experts and agents, while at the same time the contral station eyetem is being more energeteally developed and extended.

In the business of isolated lighting the Isolated Co. has met with very keen competition from the various infringers on our patents, who, finding they could not henefit themselves, have endeavored to do all the harm they could to the husiness of the Edison Company. In pursning this course, they have reduced prices to the bare cost of manufacture and installation; and while the Isolated Co. has never taken the initiative in this disastrous warfare, it has felt benud to meet the issue when forced upon it. Your Directors have many reasons for believing, that this policy has entailed heavy lesses on eur competitors, while the Iselated Ce has not only maintained its prestice and secured the bulk of the business, but it has also succeeded in holding its own financially. Seoner or later, the policy of deing business at cest must tire out these various guerrilla companies, if, judged, their eperations are not sooner checked by the enfercement of our patents; and there is ne reasen to doubt that isolated business will then be more profitable.

The arrangement made a year ago with the Isolated Co, as above stated, has resulted in very materially-sensing the expenses of your Company. Great cure has also been exercised to avoid unnecessary outlays, so that your Trustees are enabled to evoid a nariced descense in expenses are compared with former years, the expenses for the past year having hear reduced by nearly one-half as compared with the preseding year. On the other hand, the income of your Company from dividends and each licen-

ses has steadily increased, and it is not improbable that the coming year will be the turning point in the history of the company, when income will equal or exceed expenses and your Company be self-sustaining.

There is already in our treasury or due, \$652,379.25 of stock in licensee companies, made up as follows:

New Yerk	e100.000	n
Edison Co. for Isolated Lighting	888,400	2
Shamekin,	4.320	
Breckten	15,450	
Newburgh	8,100	
Fall River	18,000	
Lawrence	10,025	
Clark-Mi-		
Circleville		
Appleten	3,200	00
Bellefonte	4,800	00
Cumberland	8,500	00
Hazleten	4,050	00
Des Moines		
York	6,800	
Harrisburg	20,000	
1-111		
Ashland	4,000	
Plqua	4,000	
Middletewn	4,000	00
Tiffin	8,000	00
West Chester	4,000	00
McKeesport	13,125	
New Brunswick	10,000	
	653,870	25

This, of course, will be angmented from time to time by stock received from new companies as they are organ-

It must be meanthered, however, that four-fifths or more of the amount received by us for licenses be sub-companies in stock, and with new companies some time must necesearily always elapse before any income can accrue to your Company from dividends. As all of your licenses companies are doing well and indicate excellent earning capacity in the most future, it is plain that at no distant day our income from them will be very large. Many of them have already paid, and nearly all have earned dividends. In order, however, to oncomings some of the earlier stations, your Company has allowed them to apply their profits to increasing their plant, thereby augmenting their earning capacity and permanently adding to the value of the stock held by your Company.

The superiority of the Edisen lamp above all others was fully demonstrated at the Franklin Institute test in Philadelphia, concluded last spring. The Edisen company submitted 21 lamps. The United States Co. (Weston) 20. Westinghouse (Stanley) 20, and Woodhouse & Rawson 11.

The committee appointed by the Fundisi Institute, and who had shange of the test at first replaced broken lamps as they gave out with new ones. One lamp of the Elition, four of the United States Co., and two of the Westinghouse Course the replaced, but the committee finding that all lamps but the Elition were giving out so rapidly, concluded that it was not worth while to substitute new lamps for these broken. The final result of 1,065 hours' centinuous burning was as follows:

Edison	Lamp	s, 11	roko	n out c	f	 	 	 		. 21
Weston	"	17		**						
Stanley	**	19								
Woodho										

Thus the great superiority of the Edison Lamp above all others was sciontifically and practically demonstrated.

The question of the legal necessity of calling in the balance of increased capital stock, authorized Sept. 24, 1883, having been submitted to the General Counsel of the Company, your Board were advised by him that in order to comply with the requirements of the statute the full amount of subscriptions should be called in within two years from the date of increase. Acting upon this opinion, your Beard directed the Treasurer to call the remaining unpaid subscriptions to be payable Sept. 22, which has been done, although the financial condition of the Company did not necessitate the call.

The present authorized capital of the Company, viz., \$1,080,000, will therefore be full paid as soon as all payments on the last instalment are collected.

A profitable field for the extension of the business of our local Companies has been found in stevel lighting. In colonal Companies has been found in stevel lighting the construction was given by us to the lighting to circuste, mainly on account of the companitively for the circusters are constructed as a companitively for the construction of the companitively for the size of the construction of the companitively for the construction of the companitively constructed as a serious obstacles to the lighting of streets in an economical way. By the use of what is known as the "immidrial system," as now applied by only of what is known as the "immidrial system," as now applied by a properly of the permits the use of companies, a current of greater intensity is employed which permits the use of section of the conductors, and by placing the lamps in sorder economical conductors, and by placing the lamps in sorder economical and antifactory results are obtained. This enables our literature of the companies to companies to compute successfully with are light and gas, for street lighthing, as well as for interior lightly distilling, as

As stated in the last report, the electric railway patents of Mr. Edison were assigned to the Electric Railway Co. of the United States, in which the Light Company has one-sixth interest, viz. \$333,333.34.

Arrangements have been made with the Manhattan Railway Co., of New York, to conduct experiments on its Second avenue line of elevated railway, for the purpose of testing the practicability of the system of the Electric Railway Co., on the elevated roade in New York City. A thirt rail is now being laid on both tracks of the Second avenue line, from Chatham Square to Harlem River, a charten River, a chart

The advance of our business in pactyners has been greatly related by our related by the relative that were carriag unoney or paying fair dividends, for reasons given in reports of former years. Ophilatics were naturally unwilling to invest money in any enterprise unless it was backed by good results, no matter how favoruble the investment might appear prospectively. We can now point with pride of abmond all of our contral station companies, where financial success is an accomplished fact, and a visit to them imprise under contral the contral station configuration and the concess that the three contrals the contral station contrals and success in an accomplished fact, and a visit to them imprise under configuration of the contral station contrals and the success in an accomplished fact, and a visit to them imprise under configuration of the contral station of the station of the contral station of the contral station of the contral station.

In conclusion, your Trustees would say that nearly all the difficulties which have beset our path have been overcome, and we regard the future of the Edison Light and the success of your Company as assured.

The Balance Sheet of the Company to October 1st, 1885, is submitted herewith.

By order of the Board of Trustees.

EUGENE CROWELL,
President.

65 Fifth Ave., New York, Oct. 27, 1885.

EDISON ELECTRIC LIGHT COMPANY

Dir.	NUCIUA	PPPOTUIC	LIGHT COMPANY,
Administrative Exper	1888 :		
From Nov. 1, 1878,	to dato		\$267,307 73
Experimental and Ex			0201,001 13
penses:	III HOIVIOII	-	
Menio Park and I	aboratory E	v.	
ponses		\$100 ton #	4
General Experimente tion Expenses	n and Exidb	l-	
			276,885 94
Canvaesing and Estim	ates		30,177 14
Patents:			00,177 14
T. A. Edison		400,400 00	
Sundry Patents		W 804 00	
Patent Fees and Expo South American			,
Cauadian)
	***************************************	20,080 80	F01 F10
Open Accounte:			561,542 89
Electric Raliway Co.	of U. S	29,270 68	
Sundry Accounts		0,850 40	
Stocks and Bonde:			28,620 98
Stock Edison Compan	v for Isolator		
Lighting		255,000 25	
Stock Edison Electric	Himminating		
Co. of New York Stock other Edison El		100,000 00	
nating Companies	cetrio Biumi-		
		100,845 00	
		1,000 00	
Stock of our Company	in the trees.	1,000 00	
ury, fuil pald		84,500 60	
Cash			547,263 25
Bills Danie 13			36,749 21
Bille Receivable			4.122 74
Sundry Property Accou	ints		14,310 36
		-	21 777 000 04
			\$1,766,980 24

CONDENSED BALANCE SHEET, SEPTEMBER 30, 1885.

	_	Cn.
Capital Stock	81,080,000,00	
Less duo on Subscriptions	28,547 20	
Licenses :		\$1,051,452 80
Licensos paid in Cash	\$184,790 77	
" " Stock	405,800 00	
" " " Bonds	1,400 00	
	9001,420 77	
Less Commissions to Agents	84,102 50	
Income:		567,258 27
From Stocks and Bonds	943,680 45	
" other sources	0,595 07	
		46.255 42
Open Accounte:		
T. A. Edison Contingent Ac-		
count	800,765 70	
Sundry Accounts	765 08	
_		67,521 68
Accounts and Bills Payable		34,492 07

\$1,766,980 24

E. & O. E. New York, Sept. 80, 1885.

F. S. HASTINGS,

P-148-1

THE EDISON ELECTRIC LIGHT COMPANY.

REPORT

BOARD OF TRUSTEES

STOCKHOLDERS,

ANNUAL MEETING,

OCTOBER 26m,

1886.

BOARD OF TRUSTEES.

ELECTEO OCTOBER 26, 1886.

HENRY W. BARNES, CHARLES BATCHELOR, THOMAS C. BUCK, C. T. CHRISTENSEN, C. H. COSTER, EUGENE CROWELL,

T. A. EDISON,
A. FOSTER HIGGINS,
F. S. HASTINGS,
EDWARD H. JOHNSON,
JOHN C. TOMLINSON,
SPENCER TRASK,
J. HOOD WRIGHT.

EXECUTIVE COMMITTEE.

CHARLES BATCHELOR, C. H. COSTER,

OR, EUGENE CROWELL,
EDWARD IL JOHNSON,
A. FOSTER HIGGINS.

OFFICERS.

EDWARD H. JOHNSON, President,

F. S. HASTINGS, Secretary and Treasurer.
S. B. EATON. General Com-

JOHN C. TOMLINSON,) DYER & SEELEV,

WM. M. EVARTS,
CLARENCE A. SEWARD,

GENERAL OFFICES

16 and 18 Broad Street, New York City.

TO THE STOCKHOLDERS OF THE EDISON ELECTRIC LIGHT CO.:

The last 'wo annual reports of your Trustees have explained to you so fully the early history and progress of this Company, in spite of its many and serious difficulties, that it is not now doesned necessary to go back to the beginning. The present report will seek merely to by before you a summary of what has been done during the past year and of the present pesition of the Company.

In the least report, attention was called to the marked increase in the revenue of the Company and to the equally marked docuses in its expenses, and the opinion was expressed that the opinion was expressed that the opinion was expressed that the marked of the company of the company of the company of the company of the past twelve months, including heavy seed such as the company of the past twelve months, including heavy disbarsements for paster litigation, have been provided for by the ordinary each recologie of the Company, and there have been commissed in its toward all the stocks received for license rights granted the illuminating companies formed during the year, as detailed further on.

Onto the ceals received for balance of our own capital stock, under the cell referred to on page 16 of the last report, your Trustees resolved to create a special fund from which, except under extreme circumstances, no money should be used for the continuary exposes of the Company, it being intended that all money in said fund should be reserved for exposess incurred in prescenting our patent litigation. Happily the litigation expenses of the year have all been med without drawing on this

It now contains :

Several of our Central Station companies have increased the size of their plant since our last report; and new companies have also been organized as follows:

Nome.	Location.	Lump Capacity.
Eigin Edinon Light Co. Edinon Kleetrie Light and Fower Co. Electric Light Co. First Cincional Edinon Electric Humbruttur Co.	Chester, Ph. Eric, Ph. Eric, Ph. Derrett, Mich Mochester, N. Y. Boaton, Mass. Hockford, H. Hight, H. Anssterdom, N. Y. Attantic City, N. J. Glacinott, O. Wilkesbarra, Ph. Seranton, Ph. Tapeko, Kan. Xoli Originals, La	1,000 10,000 6,000 2,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 2,400 4,000

After deducting the amounts paid or payable to agents, your treasury lies received from these companies, for illuminating license rights, \$4,975 in cash, and \$76,950 in their stock, and there is still due from them \$21,000 in cash and \$141,025 in stock, not including the amount coming from the Alboom Company, of which the expidination is not yet determined.

The total of these receipts for the past year is equal to about 25% on our existing capital stock.

When the stocks above referred to are all received, our holdings of stocks of licensee companies will be as follows:

Annual Property of the Control of th	Name.	Locotion.	Steck.	Bonds.
And the state of t	Edison Electric Dig. Co. of.	New York	\$100,000	_
A part of the control				
The second secon				
The second secon	Edison Elec. Hig. Co. of	Minmokin, Pn		
A Company of the Comp		Brockton, Mass		
The control of the co	60	Fall Biver, Mass	18,000	
The state of the control of the cont				
See Section				
See Section	60	beliefente, Pa	42500	
New Index (1997)				
The control of the co				1500
The state of the s				
The control of the Co				
Section Better Big C. "Twelviersen, P				
And the second s				
man for the first transport of the first tran				
man and the state of the state			4,125	
Some before in the Co. Co. Secretarily 1 and 1 a				
The control of the co				
The control of the co				
The state of the s	Theater Electric Light & Deerte Co.	Now Bestorn, Mines	2,000	
See Control Co				
See A Committee				
The first bear Control				
The control of the co				
Section Sect				
Committee L. A. Power Ch				
And the Control of th				
Text Carlosinet Halves Develos Big. co., Classhandi, Mah. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20.				
Section (1997) 1. 1. Prover Co				
Comparing Comp				
Signal Process of the Control of the				
			0,000	
Missing Medical Content	eranton fug. Heat & Power Co	Scranton, Pa	7,560	
Alloon Electric Lt. & Power Ch				
Total stock of Himalanting Companies. \$187,000				
mison to, for 1904ated Lighting, full publ. 285(100 197500 Postom Dilson Light Co, (in trust). 297500 200ctrio Essilvery Co, of the U. S. 233(400	dison Electric Lt. & Power Co	81. Paul, Mion	\$11,750	
nmon on, or isotated Lighting, full publ. 286,100 Westorn Bilsen Bight Co. (in trust). 267,000 200,000 200,000 200,000 200,000	Statut stock of Allow heather Comments			
Vestorn Edison Light Co. (in trust). 107,500 Rectric Hallway Co. of the U. S. 102,600	Mison Co. for Indiated I believe feet man		\$487,000	\$1750
Vestorn Edison Light Co. (in trust). 100,000 Dectric Instituty Co. of the U. S. 233,400	do de la persona regionag, tilli pint		136,110	
neetric malieray Co. of the U. S	Vestorn Fillson Light Co. (in trust)		127,300	
	Doctrio Italieray Co. of the II. S.	***************************************	1117,400	
			333,400	
	Total stock and bands of " infison " Con-	manies	\$1,501,000	\$3,500

In addition to the foregoing, there will be stock coming to as from the Beliam Electric Huminating Compunies of Middletown, Ciroloville, Piqua and Tiffin, all of Olito, our former boldings in these four companies having been tenporally larmed over to the Olic Edison, Installation Company, under arrangements made with them some two years ago, for the support of these stations during a bitter conflict with the local gas companies, to which allusion was made on page 10 of the last report. It is a ploasure to state that three of these companies are now working on a profitable basis, and the fourth one is afready self-supporting.

The stock which we formerly held in the Sunbury Company

As so much of our own prosperity must depend on that of the licensec Illuminating Companies, whose stocks we hold, your Trustoes have sought to collect and shuth it you below detailed reports on the actual condition of some of the large Illuminating Companies orgunized and in operation up to date. Many of the recently organized companies, such as Rockford, Ameterdam, Atlantic City, Gincinusti, Wilkesbarro, Serunton, Topola, New Orleans, St. Paul and Atlouen have not yet began, or are just beginning, operations, and reports from them consequently cannel yet be made.

Appieton Edison Light Co., Appieton, Wis.

Capital \$50,000. Capacity 1,140 lamps of 10-caudle power burning at one time.

Station started 1884.

Equal to 0% per annum on capital.

This company is now making an increase of its plant.

Edison Electric Illuminating Co. of Boston, Mass.

Capital \$100,000. Capacity of station, 2,400 lumps of 16-candle power burning at one time. This station was monthally started outly last spring; but owing to delays in wiring buildings, only a small number of ismps was

7

At this rate the annual ast carmings would be 122\(\frac{1}{2} \) for equital just as 1,000 additional lamps have been connected during October, oven better smalls may be expected. So well assisted are the shareholders with the outlook for their property that they have recently subscribed to an increase of their equital to \$280,000, and have directed that the enquely of the station be proportionately developed. The manager of the station reports that he has applications from customers for over 10,000 additional lights, a good part of which will be supplied by this increase.

Edison Electric Illuminating Company of Brockton, Mass.

THERD ANNUAL REPORT.

Charles G. White, President.
Directors—Claa. G. White, Arthur B. Denny, James P. Tolman. Frank
J. Coburn, Fred. P. Richmond.

To THE STOCKHOLOGUS.

Comparative earnings for the three years :

1888-'84. 80.684:10. 1885-'80. 818.528.25.

The results of the third year of the Company are hermrith submitted to the controlled on. Its growth has been related by two districtions strikes, to provide a controlled on the time to theight the respective of the city. Our outside a controlled on the controlled our net reediges, notwitistamating, have increment twenty-taree per cent. This is to be necessaried for by greater economy of insuspensent and amore careful selection of outcomers. Our consumers numbered 188, September 2010, or property of the period of the consumers of the con

expenses.

With the abstonent of the inhor trouble, and the consequent rovivol
of prosperity in Brockton, and with a fresh domand for our light now
unanifesting itself, we may reasonably kope for better results during the fourth year of our enterprise.

Respectfully, W. L. GARRISON, Treasuror.

Brockton, Oct. 1, 1886.

BALANCE SHEET, OCT. 1, 1886.

Assure.		
License	.810,500	00
Lamps, Oll. &c	. 61,972	90
Bilis Receivable	. 443	85
Casti on Hand	. 1,644	
	. 028	50
		_

Capital Stock Bills Payable 8,910 75 \$81,487 20

BROCKTON, October 18th, 1880.

A dividend of two per cent, has been declared by the Edison Electric Blumineting Co. of Brockton, payeble November 1st, at the office of the Treasurer, to stockholders of record October 15th.

W. L. GARRISON.

q

manufacture manufacture co. of Chatherian	u, mu	
Copital \$59,000. Capacity of station, 2,400 immps barraing of a Station started September 1, 1884.		
Gross carnings, 6 months ending August 21, 1886 Operating expenses	\$8,147 4,483	
Not earnings, 0 months.	\$1,655	
Equal 0} % per ounum on capital.		

The earning capacity of this station has been retarded by difficulties which have only recently been removed.

Harrisburg Electric Light Company, Harrisburg, Pa.

Capital 3100,000. Capacity 6,300 lamps burning at one time. Station started Moy, 1885.

This company has not furnished us with detailed figures of its operations. It has been very successful from the start, and for the past year has caraed, we understand, about 28% ca its capital. It pays dividends at the rate of 20 % per annum.

Edison Electric Huminating Company of Hazieton, Pa.

Capital 801,000. Capocity 3,330 lamps burning of one time. Station storted February 11, 1884.		
Gross caruluga lest 0 months	83,754	00
Operating .expenses	2,295	
Not carnings, 6 mouths	81,518	40

Equal to 10 % per ounum on capital.

	10		
Johnstown Eice	trio Light Company	y of Joinston	vn, Pa.
Capital \$40,000. Ca Station started Feb	spacity, 1,000 lamps burni ruory 14, 1883.	ing at one time.	
Gross earnings Februar Operating expenses	7 14, 1830, to August 31,	1890	\$7,588 88 4,085 20
Net caraings,	months, 14 days		\$0,408 04
Equal to about 185;	per annum en capital.		
Edison Electri	e Illuminating Co. o	f Lawrence, N	Inss.
Capital 805,000. C Station started Dec	apacity 4,400 lamps burnl	ing at one time.	
	rts profits for six months	nf \$3,172.74, eq	ual to 18%

McKeespert Light Company of Alleghany County, Pa.

Capital \$100,000. Capacity 1,000 image burning at one time.

This company reports carnings from March 1, 1880, tn August 31, 1886,

Equal to 31% per annum on captul; but as the faregoing figures are for the summer months, they are no criterion of the year. According to the general rule in similar cases, the net carnings for its first year will be from 7% to 8%.

Edison Electric Illuminating Co. of New York.

Capital \$1,000,000. Capacity (including nanex station built August, 1880.)
9,500 lights burning at one time.
Started September, 1882. This was the first illumination station ever

....... 02,010 08

This having been the first etation ever installed, large sume were epeat on experimental work and various mistakes were also made, necessitating subsequent correction at a heavy outlay. A new station of equal efficiency could be installed for not over \$400,000, and the precent not earnings are equal to 174 % on this sum.

Edison Electric Illuminating Company of Westchester, Pa.

Copital \$80,000. Capacity 1,020 lamps turning at one time.

Bestiment started Comber 1, 1885.

Greding a princip to \$1,000 to

As may be gathered from the foregoing, the progress of our Illaminating Companies during the year has been very grain [Illaminating Companies during the year has been rows grain typing, and the outlook for the future is even more as. There are still a very few of the earliest companies which were defectively constructed, and which are not yet earning satisfactory dividends, but this condition is exceptional, and is being steadily overcome by better management. The New York Illuminating Company, which was the forerunner of all others, is now in such prosperous condition that it is auxious and ready to install three large stations up-town at a cost of \$1,000,000 or more. The money is practically secured under the trust arrangements of the future of the trust arrangements of the future of the trust arrangements of the future of the trust arrangements of the future station of the constant of the state for most set forth in our least aport, and the necessary real estate for

two of the up-town stations has already been purchased and paid for ; but the enterprise is blocked by the rather notorious Electrical Subway Commission, created by the New York Legislature, which Commission, while ostensibly appointed to put existing overhead tolograph and other wires underground. in reality refuses to grant to the Edison Company, which uses nothing but underground wires, the necessary permits to prosecute its work. The Commissioners seem to have entered into some arrangement with a so-called Construction Company. which is to monopolize the business by building a trench for all wires, and they say in substance that all companies must recognize this monopoly by putting their wires in its trench, of which the stability, when and if it is built, is at least questionable. And until this trench is built, the Edisou Company is told that it must wait, and that its practical system of underground wires, which has stood four years test, will not be permitted up-town, nor will any system be sanctioned unless it comes into the trench and pays tribute. So far this scheme has managed to keep just within the limits of the law, but the Edison Company bolieves that the entrage is now so flagrant that a mandamus against the Commissioners to allow it to put down its own conductors can be applied for with good prospect of success, and an early application to the Courts will be made.

The Illuminating Company, established several years ago at Santiago, Chili, which, owing to the extravegant manner of its construction and its unfortants black of a competent manager, met with many difficulties, has during the past year been reorganized on a sound working basis; and a payment of stock from it to your own company for liceous rights will shortly be

The business of street-lighting, or what is known as our Municipal system, to which reference was made in our last report, has developed considerably during the year, and after some preliminary difficulties, is now in successful use in Portland, Maine; also Denver, Col., Lockport, N. Y., and Seattle, W. T. In general it may be said that this valuable feature of our business has reached a practical footing.

The operations of the Isolated Company, while very large, have not been satisfactory. Competition in isolated plants must be expected until our patent suits are decided; and during the past year this competition has been so keen as to leave no money whatever in Isolated business; indeed, oftentimes sales have had to be made at less than cost. If any profit at all has existed, it has gone to the manufacturers, and your Trustees, together with those of the Isolated Company, have sought to have our manufacturing companies take charge not only of the making, but also of the selling of Isolated plants while this unsatisfactory state of affairs exists, on a basis of equity to all concorned. In this desire they were met most readily and fairly by the manufacturing interests, and the result was that last summer Bergmann & Co., the Edison Lamp Company and the Edison Machine Works, while each preserving their own identity, mited informing The United Edison Manufacturing Company, which concern has now taken over from the Isolated Company all that portains to Isolated business, agreeing to pay the Isolated Company certain fixed royalties and also one-half in any profit that may be shown. Thus our manufacturers are brought in direct contact with our competitors, the expensive clerical machinery of the Isolated Company is abolished, and profits in the way of royalties are secured for the Isolated Company. The wisdom of this change must be so apparent that your Trustees deem it unnecessary to dwell on the subject at any great length.

The Ioslated Company still acts as our Exploiting Agent for Central Station business muder the contract ando in 1884. While that arrangement was necessary at the time, owing to the low financial condition of your Company, and has resulted greatly to your benefit, it is now believed that the success of your Company and also of the Ioslated Company, could be promoted by the consolidation of the two enterprises.

The paid in Capital of the Isolated Company is \$370,200 issued for each and \$382,500 issued to this Company for patent rights. There is an additional amount of capital which has not yet been called for by the Isolated Company and which it now seems unnecessary to call.

It is proposed in substance, therefore, that the Capital of the Isolated Company be fixed at its present amount, say \$752,-700, against which it has on hand, cash and available assets for about \$370,000, and the patent rights acquired from us for \$382,500, as stated above, which patent rights carry with them valuable royalties developed in the Isolated business. The Isolated Company can turn over to this Company all its assets, patent rights and royalties of every kind and in exohange it is preposed we shall cancel our own stock holdings in the Isolated Company and issue to it such an amount of our stock as will give each steckholder of the Isolated Company in the proportion of \$300 of Light Company stock for every \$400 of Isolated stock now outsanding. Your Board are entiroly in favor of this plau, and recommend that all necessary stens be taken to carry it out. They believe it to be equitable in itself and calculated to promote the bost interests of all concorned

The centract proviously existing between this Company and the Western Editon Light Company, which exploits both our Londsted and our Control Station business in the States of Wisconsin, Illinois and Jown, has been considerably modified. The Western Company had been put to great disadvantage, especially with its campetitors in Isolated business, by reason of certain escens restrictions in the original contract, which were of little or as practical value to us, while they acted as an affective barrier to any considerable business by the Western Company. At the time of its organization the Western Company paid as Solyo oli case for its liconous rights, and under the new arrangement there is held in trust for our benefit \$100,-00 of its stock col of \$800,000 capital yhigh the Western Company is gradually to retiro by delivering to us in its stead stock of Central Stations to be organized by it under conditions satisfactory to us.

The Electric Rallway Company of the United States has continued its experiments with some degree of success, though not so satisfactorily as was hoped for a year ago. The defectoril to the same hoped for a year ago. The defectoril to see a second provers to be not by contain invontions controlled by the Syrague Electric Rallway and the Electric Rallway, with which this Company and the Electric Rallway of the United States are on most friendly resultations, and a consolidation of the two systems is now under taken and the states of the Syrague Company raw so moved in their chanacter that it is believed they would be peculiarly free from interference with or trouble from other turner to tors; and, taken in connection with the catallation claims of other the Electric Rallway Company of the United States, would the Electric Rallway Company of the United States, would

During the past year the counsel of the company have been actively condusting the Highigation on our practest. In some of the suits brought against the various infringing companies, testiancey on behalf of this company has been already taken, and in othorn is in process of taking. In those satists where it is claimed the American patents have expired by reason of the initiation of foreign patents, the question of the involved will probably be agued this fall. Testimony has also been taken in the suits brought against this company by the Comoidated and United States Companies, and all the suits brought both by and against this company are being pressed by the commisd of the company as rapidly as possible, and it is expected that within the next war sense definite results will be reached.

Within the past few months our central station patents have for the first time been infringed. Suits are about to be brought on these patents and will be pressed with the utmost vigor. The great amount of work required in these litigations has made it necessary to emply additional advisory connest, and.

at the suggestion of the counsel of the company, in addition to Mr. Evarts, Mr. Clarence A. Ssward has been retained.

Active work has been done in the soliciting of new patents, and several important patents have been obtained.

In the past, your Board has received frequent requests to furnish statements showing the prefit or loss on your business. These requests, while most unturnl in themselves, have been quite impossible to comply with, ewing to the question of valuation of patents. In determining the result of business, at what sum should these patents, which have cost about \$750,000, be carried ferward? Until within the last two years their value had not been demenstrated; we now have, however, reached a stage which offers some basis for calculation. In the past twelve months your patents have carned for you \$244,350. at which rate they would pay for themselves in three years, and under such circumstances, your Board would esrtainly be justified in carrying them forward at their cost as they are ovidently worth that sum many times over. Acting, however, on the theory that the cost of patents, however valuable they may be, should be gradually written off, as the life of the patents themselves grows shorter year by year, your Trustees, in making up the statement of profit and less attached to this report, have deemed it prudent to charge off 25% of the cost of all patents, and recommend that hereafter an annual reduction, of say 15% of their cost be continued, so that in a few years the account of patents shall disappear from our books altorathor.

In the computation of Froit and Leos, the stocks of our various Illaminating Genapanic held by an know has taken at their per value, thought on the average they are worth mean. It may not be amine to satis here that the practice of insuing watered stocks has not been paramitted by us in the case of any of the Edison Humanistan Gromponias, and they all represent, dellar for dellar, cosh paid in and the regular payment to us for our license rights.

It will be noticed that in the statement of Profit and Loss, the stocks of the Isolated Company and of the Electric Railway Company have not been taken into consideration, though if they had been taken into consideration, though if they had been taken at their face they would increase the result by \$715.000; but at the value of the railway shock has not yet been shown, and as the Isolated Company will probably be sherrly consolidated, with us, your Treation have predirected to orr on the conservative side, and leave those items in absquance for the presson.

Your attention is invited to the Balance Sheet herewith.

By order of the Beard of Trustees, E. H. JOHNSON.

Vice-President.

New York, October 26, 1886

Dil.			
	-		_
Stocks and Bonds:			
Stock Edison Co. for Isolated Lighting	\$250,000 25		
	127,500 00		
Go. Electric limitway Co. of the U. S	330,400 00		
do. Electric Huminating Co. of N. Y. do. of other Edison Electric Huminating Comp in its.	100,002 00		
da. of our own Company in Treasury, full paid	\$15,795 CO 81,790 CO		
da. of Grammo Co. (pur \$5,000)	1 00		
Dinds of Asitinna Co	100 00		٠
de. Johnstown Co	8,000 00		
-		\$i.146,014	21
Patents			
T. A. Edison	\$100,400 00		
Sundry Patents	0,000 00		
Neulo Park Expenses. Patent Fees and Expenses.	100,087 51		
Various Experimental Expenses,	79,105 EG 50,905 GO		
	39,337 72		
	30,700 39		
	31,879 48		
Smalry Expenses	9,874 03		
-			
Less Staking Fand, 255; (see page 16 of Report)	19 358, DUTS		
and a send too, free bake to or reflection	indroi 98	503,806	
		403,200	91
Special Trust Fund (See pages 3 and 4 of Report)		51,612	80
Invested in \$13,000 N. Y. Control & Hudson			
R. H. 55g bonds, worth \$33,440 00			
Loan on Demand			
Coast in Trusteen' hands			
Present value			
Western Edison Co. Stock		100,600	
(See page 11 of Report.)		100,600	00
Open Accounts:			
Electric Ballieray of U. S.	\$50,570 68		
Bills Beceivable.	5,539 00		
canny accompany	2,332 28		
		86.763	26

Capital Stock	\$1,678,800 10
Open Accounts:	
T. A. Edison, Contingent Account (see page 12 of Instruction report). 485,103 TO Study Accounts and Inflor Payable. 55,703 Ed. Accounts and Inflor Payable. 55,703 Ed.	112,060 15 28,120 00
Profit and Loss	
Stock Licenses, Special Account, Not yet carried to Prott and Less (see page 17 or Report)	715,600 06
	/ <u>.</u> .
· /·	
. /	
- /	
/ .	
/	
•	81,634,428 18

E. & O. E. New York, Sapt. 36, 1880. F. S. HASTINGS,

STATEMENT OF PROFIT AND LOSS ACCOUNT.

Sитемпен 30, 1886.

CR.		
Stock and Bond licenses		
Cash licenses	\$540,709 152,870 50,874	77
	8758,445	13
DR.		
Administrative, carbiblities, caravassies, legel and miscellamous expresses, Nov. 1, 1878, 60 date 923,260 2 80 sundy worthless secounts, sharged of 98,100 according to the companies of	725,818	_
E. & O. E.	-	200
Naw York, September 39th, 1889.		
F. S. HAST	INGS, reasurer.	
Norz.—To this amount of. There is to be added the amount due, but not yet received, from various Illuminating Companies for licenses, as stated on page	\$28,265	01
4 of report, viz, Cash	21,000 141,525	
Making total at the credit of Profit and Less	\$191,600	01

[10762]

C.S. 825.

THE EDISON CENTRAL STATION

THE

EDISON SYSTEM

INCANDESCENT LIGHTING

AS OPERATED FROM

CENTRAL STATIONS,

UNDER THE PATENTS OF

THOMAS ALVA EDISON AND OTHERS.

OWNED BY THE

EDISON ELECTRIC LIGHT CO.

REPRESENTED BY THE

EDISON COMPANY FOR ISOLATED LIGHTING.

65 FIFTH AVENUE,

NEW YORK.

SECOND EDITION.

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C. G. Bassayur's "Oriek" Date and an Come form

THE EDISON ELECTRIC LIGHT CO.

OFFICERS.

RUGENE CROWELL, PRESIDENT.

EDWARD IL JOHNSON, F. S. HASTINGS,

VICE-PRESIDENT. SECRETARY AND TREASURER.

DIRECTORS.

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R. L. CUTTING, JR. F. R. UPTON. ERASTUS WIMAN.

CHAS. BATCHELOR. F. S. HASTINGS.

THE EDISON CO. FOR ISOLATED LIGHTING.

Licensed by the Edison Electric Light Co. for the sale of Isolated Plants, and the formation of Central Station Companies.

OFFICERS.

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DIRECTORS.

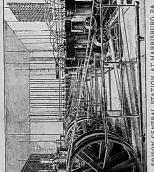
E. II. JOHNSON. DR. E. CROWELL. T. A. EDISON.

J. HOOD WRIGHT.

C. II. COSTER.

SPENCER TRASK. F. S. SMITHERS. THOMAS C. BUCK. ANTHONY J. THOMAS. F. R. UPTON.

CHAS. BATCHELOR.



DISON, CENTRAL STATION, AT HARRISBURG, PA CAPACITY (EXCLUSIVE OF RESERVE, 4800 LAMPS.

THE EDISON SYSTEM

LIGHTING FROM CENTRAL STATIONS.

New York, July 1st, 1885.

In order to answer the many empiries constantly coming in from all parts of the country, we take pleasnre in submitting a condensed statement of our business, its success electrically, mechanically and commercially, together with a brief outline of its history, and especially to state generally the methods adopted for the formation of sub-contenties for the purpose of lighting cities and towns from central stations. For the information of any who may be unfamiliar with the subject, let no first on-sider the light itself.

ARO AND INCANDESCENT LAMPS COMPARED.

These two systems of lighting are radically different and distinct, a fact which must be borne in mind when considering the question of what is popularly called "Electric Lighting." The are is a light of great intensity—end lamp being the result of about one-horse power of steam energy condensed in one small point—is very drazzling and trying to the eye, and, from the very nature of its mochanism, is unsteady, flickoring and changeable. Its

bad economy is due partly to the great amount of energy condensed in so small a point, the diffusive power of the light not being in proportion to its great intensity, or, technically speaking, the volume of light decreasing inversely as the square of the distance.

The incandescent is a small, soft, stendy light, of the brightness of an ordinary gas jet, and is therefore especially adapted for domestic and industrial purposes.

THE EDISON INCANDESCENT LAMP.

The lump itself consists of a penr-chapted glass globs about four and a half inches in height, exhausted of air, into which is sealed a filament of curriconized homboo slightly thicker than a horse-law. This filament, hecoming incandoscent by the passage of the current of electricity through it, can'ts a heautiful, soft, white light, absolutely steady and constant, and equaling in intensity, or exceeding if desired, the illuminating power of a gas jet of the best quality.

The lump is serewed into socket which is permanently attached to a gas or other chandlelier or bracket, and contains a Key whereby the light in the lump may be turned ou or off. The lump, once serewed into the socket, needs so further attention or enre until the earl-bon breaks, when the old lump is unservened from the socket and a new one serewed in, the work of a fow seconds, and of an ordinary domestic. The lumps way in the number of hours which they will burn, but their average life, at 16 candle power, exceeds 600 hours of actual burning. Each light is entirely independent of the others, and may be arranged and controlled singly, in pairs, or in groups of any desired number, and may be placed in any position whatever, inverted or otherwise.

The Edison lamp gives out but little heat (less than one-diffeenth as much as gus), may be grasped by the naked hand without inconvenience, is absolutely free from odor and poisonous or noxious gases, and neither heats nor vitiates the surrounding atmosphere.

The lamp does not explode, and even if the glass is broken by any accident, the carbon is instantly consumed and the light at once goes out harmlessly.

Besides being innequalled for domestie and general illumination, the light is especially adapted to the vorkslop. For the desk and workhendt it is superior to any other artificial light, insamuch as it is absolutely steady, and by inverting the lamp, its whole light may be thrown on the work in hand, in any required position whatever.

The light, although bright and clear, is not injurious to the eyes, even if used close to them. Indeed it is found in practice that weak eyes, previously injured by gas, may use the light with impunity.

gas, may use the light with mipmure.

The fixtures used for this lamp are of the same general elaracter as those used for gas, including swing brackets, drop lights, portable lights, together with devices for inverting the light or barrning it in any position, perpendicular or otherwise, and also for burning it in fredamp and under water.

SAFETY.

There is no danger to life, health, or person, in the current generated by any of the Edison dynamics. The intensity of the electric current is so feelle that the wires at any part of the system, and even the poles of the generator itself, may be grasped by the maked hand without the slightest effect; in fact, the current is searcely perceptible to the tonel.

INTRODUCTION OF THE SYSTEM.

The Edison Electric Light Company was organized for the purpose of acquiring and owning all of Edison's patents for electric light, heat and power, in North and South America, and from this, the Parent Company, all the sub-companies working under the Elisis system derive their existence. Of those patents, 260 have been abruly issend in the Dirtles States, including the patents securing to the Elison Company the frankmental principles of incademost lighting, and there are applications for 187 mbHiston patents still pending in the Patent Olles, which number is being constantly creased by Mr. Elison's further invontions. Those in continuous patents of the patents of the complete system of Elison's incumdascent lighting, now so completely introduced into public

There are two methods of introducing the light, viz., by independent or Isolated Plants, where the apparatus is owned, controlled and operated by the user of the light, and by the Central Station System, where the current is generated at a common source, and distributed, after the general plan adopted by gas companies. The first method is conducted by the Elison Company for Isolated Lighting, which was organized in November, 1881, and which, as a licensee of the Edison Electric Light Company, is entitled to do business under the Edison patents for electric lighting. Since its organization, and my to this date, there have been installed in mills, factories, hotels, stemuships, stores, residences, etc., in the United States alone, npwards of 500 isolated plants, aggregating about 126,000 lamps, in addition to about 70,000 lumps operated from central stations.

The installation and use of these isolated plants, mostly by private enterprise, have involved individual investments varying from \$300 to \$60,000. No other cridence could more forcibly demonstrate (1) that the light, as a light, mast be giving satisfaction; (2) that being used on so large a scale, its economy is firmly established; and (3) owing to the large sums of money invested in plants by individuals and corporations, the value of the system as an investment has been determined beyond possibility of doubt.

It has frequently been found that the cost of the light in mills, etc. (where attendance and power are present, but including a proportion of their cost), has been equal to gas at forty cents to one dollar per thousand feet, varying with the cost of fuel and the number of hours yearly use.

Estimates for lighting of this class may be had on application to this office.

CENTRAL STATION LIGHTING.

The inauguration of this business on a large scale was commenced by the granting of a license to the Edison Electric Illimitating Company of New York. This company selected its first district in the lower part of the city, and immediately proceeded to install a central station plant with a capacity of 8,000 lamps.

About twenty-eight units of conductors were hid mode the streets, and the current was first delivered to a small number of customers, September 4th, 1882. The first hills for hight were enclosed to entsumed a January, 1883. The price charged for the light in this district is the tent of I gents per hour for each sixteen caudle power hum, which is equal to gas at 82,25 nor disonant feet.

The Edison meters furnish the data, in every case, from which the bills for these ensteamers are under out. Each has a meter in his own premises, and his bill is made out and payment required upon what the meter shows. This indexible rule has resulted in fixing close attention upon the meter, and has enused its accuracy and reliability to be subjected to severe tests. To measure accurately the describe current by means of a motor, and to do so with sufficient exactness to make on a bill, the payment of which was to be insisted upon, at first seemed to many of our ensteamers an impossibility; and they accordingly resorted to various devices for the purpose of tienselves testing the accuracy of the measurement. The most noteworthy of the country of the reason that it affords a simple and effective eleck against an increrect bill, was to keep a record of the hours each lamp was in use, and, by multiplying this number of lamp hours by the given cost of a lamp per hour, to determine what the amount of the bill ought to be.

There have been many eases where, in order to satisfy enstoners that the meters were reliable, we have taken them out at the end of a given time, during which the enstoner has kept an account of list hamp hours, and have presented bills made out on what the netters showed, in order that the enstoner might check the amount of the bill by the simple rule mentioned above. In all of these cases the necessary of the meter has been maintrianed, and the confidence of the public has steadily increased, so that, at the present time, it can be safely said that the Edison meter, originally considered by some to be, possibly, the only doubtful part of the Edison system of central station lighting is now generally admitted to be both scientifically and practically expended and reliable.

Perhaps the most important element in the success of an enterprise of this nature is the commorcial aspect, as shown by a halmee sheet. In this connection, it should be borne in mind that our first district is one of the porrest in this, or, indeed, in any other large city, by reason of the limited amount of night lighting. The district embruces no residences, hotels, selloos, thecurrent or places of amusement of any kind, nearly all the lighting being done during the day, and a large portion of it only from dark until about six o'clock P. M., during the winter months.

During the past eighteen months we have increased the capacity of the station about forty per cent, which increase has been paid for out of our carnings, the entire capacity has been taken up by new ensomers, the company is entirely free from delst, with n cash surphs on head, and applications for more light them the station can supply. The carnings will hereafter be applied to the payment of dividends, which are now being declared and paid regularly, thus demonstrating the commercial success of the Edison system of lighting from central stations, even in a first experiment with all its attendant unitakes and extraordinary costs.

As already stated, the price charged for the light is an equivalent of gas at \$2.25 per thousand. Some months ago the price of gas was reduced to \$1.50 per thousand, for large consumers. You of our largest castomers, proprietors of a well-known establishment, operatomers, which is that although they must preferred our light, miless we would make a corresponding reduction in our price, of gas as a measure of economy. We declined their proposal, out the ground that we had upwards of one lumdred applications for the light in excess of the capacity of the station. Several months have clapsed, and they continue to use our light and pay our bills, regularly, at the old, established price.

That the reduction in the price of gas did not affect the sale of our light will be shown by the following statement: we lost nine consumers—300 lmmps—from whom we received \$250 per month. This loss gave us an opportunity to supply current to seven others that had been impatiently waiting till we could

supply them. Among these, Harper Bros., Bank of New York, New York "Sun," etc., aggregating about 320 lamps, for which we receive about \$450 per month.

The system of Central Station Lighting being proved commercially, we have been effecting the formation of central station lighting companies, with local capital, in various parts of the world, a partial list of which is given below:

NAME OF CITY OF TOWN.	STATE.	No. of Lamps.
liedia	Germany Italy Trusty Turin. Francy Turin. Francy Turin. Olio. Prunsy Turin. Olio. Juneachure(6. Prunsy Turin. Juneachure(6. Juneachu	14,000 8,000 8,000 500 1,000 2,400 1,000 2,400 1,000 2,400 1,000 1,000 1,000 1,000 1,000 1,000 1,000 5,200 1,000 1,000 1,000 5,200 5,000 5,000 1
Harrishurg Westchester	Pennsylvania	1,60 1,00 1,00

WILL IT PAY?

Those of the above-mentioned companies that have been in operation a reasonable length of time show that they are carning a hardsome dividend on their capital stock, varying from six to twenty per cantum per anuma, although none of them have as yet connected the full capacity of their respective stations. others will be continued regularly, in proportion as the business of the several stations increases. Take as an example one of our more recent stations. The company referred to started with a capacity of 3,200 lamps, with a reserve to provide for necklent. Following our advice, and in many particulars even exceeding our recommendations, the station was installed in the most thorough possible manner, with numble reserve both in meelanical and electrical appliances, so that neither would ever be called upon to its utmost capacity, thereby seeming the maximum of economy and minimum of depreciation. As a result of the confidence thus inspired, consumers did not hesitate to abandon gas, knowing that the supply of electric current would be onite as much to be relied upon, and the station was started May 1st, last, with 3,000 lamps connected, all of which were under contract for one year or more. These contracts secured to the local company

\$1,700 per month. The company is now carning at TWENTY-ONE PER CENT, PER ANNUM,

a net profit, above all expenses and depreciation, of

the rate of

and will soon begin to pay regular ten per cent, semimmual dividends

This gratifying result has led the company to increase its capital stock, and orders for additional apparatus have just been given which will increase the present capacity of the station from 3,200 to 4,800 lamps. Aside from the character of the investment. this enlargement of the plant has been made necessary by reason of the rapidly increasing depund for the light.

PLAN OF ORGANIZATION.

Our present policy is not to part with large portions of territory, or to sell territorial rights, as is being attempted by companies not yet past their experimental stage, but to grant to separate companies, formed with local capital, exclusive licenses for the use of the Edison patents, within specific cities and towns.

In selling a central station plant to a sub-company so formed, instead of charging a cash profit for the plant and equipment, we charge only the actual cost of the plant, and in lieu of all profit we take a percentage of the capital stock of the sub-company, payable generally five per cent, in cash, and the balance in the stock itself, which insures to the sub-company our interest in the successful operation of the plant.

By this plan the Edison Electric Light Company becomes a large stockholding company, and its prime object, as a partner in the various sub-companies, is to make their stocks dividend-paying, since its own income must be derived from the dividends accrning on the stocks which it holds.

This will be recognized as a measure obviously in favor of the sub-licensee, and we have been led to its adoption by our faith in, and knowledge of, the possibilities of the system commercially, as well as mechanically and electrically.

Were we to sell the plant outright, charging an ndvance over cost, and taking the profit in cash, the revenues thus accumulated would bring us in only the enrrent rates of interest, whereas we have now had sufficient experience to assure us of a much greater income by taking these profits in stock, and so retaining an interest in each central station plant,

In consideration of this stock profit issued to us by the sub-company, we grant an exclusive license for the use of all of Mr. Edison's inventions relating to electric light, heat and power within the corporate limits of the city or town to be lighted.

COST OF CENTRAL STATION PLANTS.

A central station plant and equipment consists of a lot, building, boiler, engines, dynamos, apparatus for regulating the current in proportion to the number of lamps in use, meters, street conductors, and a full complement of the tools, instruments and apparatus required for the proper operation of the system. It is impossible to estimate accurately the cost of such an equipment complete, without making a survey and emivass of the city or town to be lighted, although for a given number of lamps, the cost of the station equipment itself may be ascertained by application to this office, or to an agent of the company. The unknown quantity is the cost of the street conductors, which varies in every locality, and depends upon the distribution of the lamps, their distance from the central station, whether compact or scattered, &c. From a general description of a town, its population, area, &c., a comparison may be made with other towns already lighted, and, by such a comparison, a general idea may be formed of the approximate cost of a plant, which will serve as a guide in the formation of a company. Before executing a contract, however, an accurate canvass and determination are made, and the sub-company is furnished with a detailed statement of the cost of the plant, at which price it will be installed and operated for a sufficient length of time to instruct the local employees in its use, when it is turned over to the sub-company in complete running order.

It must be borne in mind, however, that this company

makes no profit whatever in the installation of these plants, and, being a stockholder in the local company, our interest is in having the plant installed at as low a cost as is consistent with theroughly proper constraint. It is, therefore, at the option of the local company to purchase the loilens, engines, dynamos and apparatus themselves, installing their own plant, or plans and specifications furnished by us, with the aid of our experience and under the personal supervision of our own trained experts. On the other hand, the rapid growth of the lunishess has led to the organization of responsible constructing firms, who are theoroughly competent to creek and equity these stations, and who will at any time furnish estimates and proposals for the work.

Construction of Stations.

These stations are now constructed in accordance with a standard adopted by the new management after a personal and most thorough examination of the past experience and present condition of existing stations. This examination has forced the present management to the inevitable conclusion that in the construction and operation of central stations, there are two elements, which, while they have always been regarded as important, must now be insisted upon as absolutely assential to the successful development of the business.

We refer to economy and reliability; I but while economy is to be carefully staticled and sought after, both in econstruction and operation, economy in operation is the desideratum, and we will demonstrate conclusively, not only that this feature of success does not always follow what would ordinarily be regarded as economy in construction, but that it can only be secured by a fudicions libentify of expenditure in the first cost of the

plant. Important as this may be however, it sinks into insignificance when compared with the one vital question of reliability. This is the one requisite, sine qua non, paramount to all other considerations, and the one principle which we, as stockholders with the local people, must now insist upon as essential to the establishment of a fixed commercial and intrinsic value to the stocks accumulating in our treasury. How to secure most effectually this end has been the study and sim of the present management.

Our first central stations were put in on the theory that as the engines would be selected of such a size as to obviate the necessity of their ever being worked up to their normal capacity, no reserve would be required. Although this theory was in a measure correct, it was found in practice, that many gas consumers, whose business accessarily depended to a certain extent upon some form of artificial light, were unwilling to ent off their supply of gas, so long as their supply of electric light would depend upon the reliability of one engine. The explanation that there was a reserve capacity in that engine itself was not sufficient to satisfy them in assuming what they regarded as a risk. In order to overcome this prejudice some of our local people were therefore compelled to put in spare engines and dynamos in order to induce some large consumers to cut off their gas, and by this memos they succeeded in seeming some. of the most desirable enstoners within reach of the stution. Hence, we now insist on carrying out this general principle of providing a reserve wherever possible, in every detail of construction, with two inevitable results: first, the public is inspired with confidence from the fact that they can depend absolutely upon a constant supply of light, so far as any human foresight can assure it, even with greater certainty than can be expeeted from an ordinary gas works; and, second, by

reason of the confidence thus inspired, the station is started with a sufficient number of customers to insure a prolit from the beginning, and to earn a dividend the first year of operation.

Cost of the Light.

The cost of producing the light and distributing it from central stations varies greatly, according to the size of the plant, the average hours of daily use, &c. For example, a plant with a given capacity and the requisite employees, will require a certain number of lamps connected and running, in order to pay the actual expenses of operating. Increase the number of lamps, the receipts will be increased proportionately, while the expenses of operating will remain almost constant, excepting the cost of the additional coal and lamps, which is a small proportion of the aggregate operating expenses. As a practical illustration, the experience in some of our central stations already in operation may be of interest.

In one city, the price charged consumers was fixed at an equivalent of gas at \$2.25 per thousand, and the station commenced operations with only a small proportion of its lamp capacity in use. After running a short time, it was found that the actual cash receipts were only sufficient to meet the running expenses. Under these conditions, the cost of the light to the company was equal to what it received, viz., m. equivalent of \$2.25 per thousand feet for gas; but at that time there were connected and in use only a very small proportion of the number of lumps for which the station was enlenlated. New enstomers were duily added, until the eash receipts were nearly double the expenses, and by the sume calculation it was found that the light cost the

company an equivalent of \$1.15 per thousand for gas, or only a little more than-one-half of what they were receiving. As the number of humps increased, the increase of running expenses was barely appreciable, while the receipts were increased proportionately with the number of humps connected.

In another gas tows, a central station was started a short time ago, with a capacity of sixteen lumdred lamps. At the present time they lave only four lumdred lamps connected, and the income from these is safficient to pay the ranning expenses of the plant, showing that when all the humps are connected, a very hand-some profit will be carried, which, it has been estimated, will be sufficient to pay numally a dividend of more than twenty-five per cent, on the capital stock of the company.

In a still smaller town, a plant of only five hundred lamps, which has been in operation only a short time, is already carning a profit which will be equal to an ununal dividend of twenty per cent. on the capital stock of the company.

While those statements of facts in connection with the cost of the light are interesting by way of comparion, experience dictates that the price of gas in a city or town has absolutely no bearing whatever out the price of the incandescent light. Such has always been the theory of Mr. Edison, and it has been fally and inotably borno out by experience. The policy of our sub-companies has been to fix a fair price for the light, assailly about the same as has been changed for gas, and to stand by that price without regard to any action the gas companies night take. In one town, where gas was selling at \$4.00 per thousand, our sub-company, considering this price too high, and being confident of a hundsome profit ou a lower hasis, commenced charging an equivation of \$2.50 per thousand. The gas company, becoming abunued, immediately lowered their price to \$1.10 per floorsund. The result has borne out our theory in per floorsund. The result has borne out our theory in every particular, and not only have they under such circumstances failed to influence any enstoners from its, but in unuay instances, people who had been using Kerrasen galuly look our light af the price established, although the gas company offered them every inducement to use gas, in some instances going so far is to offer to furnish a full equipment of gas pipe, fixtures, &c., free of excuses to the consumer.

The following table, showing the cost of operation, is not a mere estimate, lut it sheed more the experience of stations nettnally established. Such items as conj, water, taxes, busanuec, &c., will, of course, vary in different localities, but are given as a fair average, with the exception of conj, which is calculated at four dollars per ton. The daily consumption of light is calculated 2½, 3, 3% and 4 hours consumption.

ESTIMATED MONTHLY RUNNING EXPENSES.

SASED UPON STATIONS ALREADY IN OPERATION.

94 Hores Avenue

Capacities	800 Late	ľ۴	two tar	nps.	1600 f.m	sps.	2100 Lat	որչ	2200 Lan	ges
Labor	\$100	00	8145	00	8170	00	\$200	00	8250	-
Coul*	41		60	00		00	130		186	
Lamps	go.	00		00	120		180		210	
Waler		10		50	10			60	21	ő
Oil and Waste.	7			50	7	50	10	00	15	
On and waste.	12	no ,		50		00		00	48	
Repairs										
lusurance	8			60		00		00	25	
Taxes	8			ΘÜ.		60		00	25	
Sundry Extras	30			90		00		00	89	
Statlonery	4	50 ,	4	50	4	59	4	50	4	5
	4276	00	\$397	00	\$404	20	\$877	78	8844	0

Cuprelities. HO Lamps. 1900 Lamps. 1000 Lamps. 2504 Lamps. 3500 Lamp

Labor	\$100		\$145	00	į	÷135		\$200			\$250	
Coul*	50	00		00		112		167		1	223	
Lamps		00	108		i.	144		210		١.	288	
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Oll and Waste.	7	50	1 7	60		7	50	12	00	Ł		60
Repairs	12	00	18	00	1	21	00		00	!		00
Insurance	8	00		00			00		00			60
Taxes	8	00	12	00		15	00	20	00	1	25	00
Sundry Extras-	:10	00	: 30	00			00		00	1		60
Stationery	4	20	4	ħΟ		4	50	. 4	50	i	- 4	50
	4:104	00	6430	00		5589	00	8724	12	1	3102	50

34 Horns Avenaor

Capacities 800 tamps, (200 Lamps, 2000 Lamps, 2000 Lamps,

Labor	A100	00		8145	00	1	\$175	00	÷200	00	6250	
Coal*	65	00		98	16		1:30	00	195			
Lamps	81	00		120	00		168	00	332		: 330	
Water	- 7	0.5		10	44		14	10	1 21	15	1 21	00
Oil and Waste.	7	50		7	50		7	50	12	00		190
Remirs	12	00		110	80	1	24	00	:10	00		10
lusurance	8	00	i	123	00	٠	15	00	20	00		O
Taxes	8	00	i	12	00	1		00		00		· OK
Sundry Extras.	30	00	÷	30	00	į.	30	00		60		00
Statlonery	4	50		4	50	ı	4	50	4	50	4	54
	9320	05	Ŷ	÷465	40	ľ	9584	10	\$701	21	\$1,025	50

4 Horas Avenage.

Capacities.	See Lamps.	1000 Lauges	1000 Framber	2000 Lnuspec	2000 Lossope.
Labor	8 16 7 50 14 00 10 00 8 00 30 00	\$145 00 111 60 144 00 12 24 7 50 21 00 12 00 12 00 4 50	8175 00 149 00 192 00 10 20 7 50 24 00 15 00 15 00 4 50	\$200 00 221 50 288 00 24 10 12 00 20 00 20 00 20 00 4 50	\$250 00 296 00 384 00 32 40 15 00 48 00 25 00 25 00 4 50
	4359 50	8400 84	8028 20	\$858 30	\$1,111 10

'Norg.-Coul is enjoulated at 14 per ton.

PROFITS AND DIVIDENDS.

Given a complete station, and the cost of operating it under varying conditions, it remains for the local company, as in any other enterprise, to adopt such management and business methods as will insure an economical administration of its affairs, and a fair price for its product.

In the tables on the following pages the expenses have been taken from the table on the preceding pages, and the receipts have been based upon an equivalent of gas at \$1.50, \$2.00 and \$2.50 per thousand feet, with a daily average consumption of from 2½ to 4 hours.

STATEMENT OF ESTIMATED PROPITS.

800 LAMPS, CAPITAL \$32,000.

	@ \$1.50 PER 2,000 CANDLES.	CANDLES.			@ \$2.00	@ \$2.00 PKH 2,000 CANPILES.*	CANDLES.			@ S-2.18	@ \$2.50 PRH 2,000 CANDLES.	CANDLES.*	
Yearly Beeriple.	Youth Experies.	Profit.	Principal Divident	Hours Hub.	Venify Beviges,	Franty Expenses,	F. F.	Perculas for Division,	H	Venty Berdek	Postly Equipmen	ΝĚ	Precribate for Dividend,
2,200 2,400 2,200 2,000 2,000 2,000 3,000 4,000	82,950 8,460 8,735 8,735	81.540 2,160 2,840 8,475	4445 %%%% %%%%%	ಕೊನೆ-	\$6,000 8,400 9,600	25. 25. 25. 25. 25. 25. 25. 25. 25. 25.	\$3,040 4,940 5,875	2000 B	€###	97,500 9,000 10,500 12,000	000 55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	24,540 7,040 8,273	35888 35888

1,200 LANDS, CAPTAL \$40,000

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2333		-
96,320 8,310 10,506 12,710		
25,000 1,000		-
811,250 13,500 18,000		
300 50 4 200 50 4		
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138.0% 13.0%		STORY IN
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COMPARISONS WITH GAS.

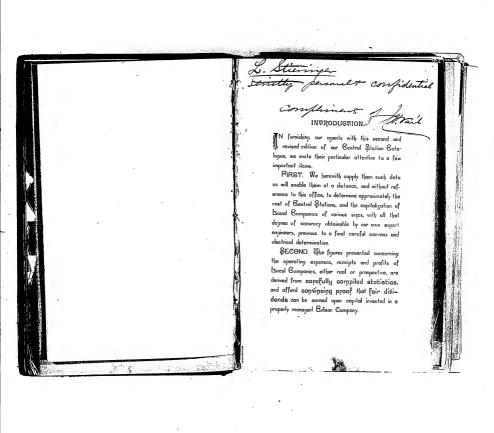
While comparisons with gas are interesting for purposes of calculation, practical experience affords duily evidence of the fact that the price of gas has no more influence on the price of our light, then the price of candles has on the price of kerosene. On the same principle, it is difficult to demonstrate theoretically with the advent of elevated railways, with their enormous patronage, has not done away with surface cars; and yet the fact remains that there is patronage for both, and both are financially successful.

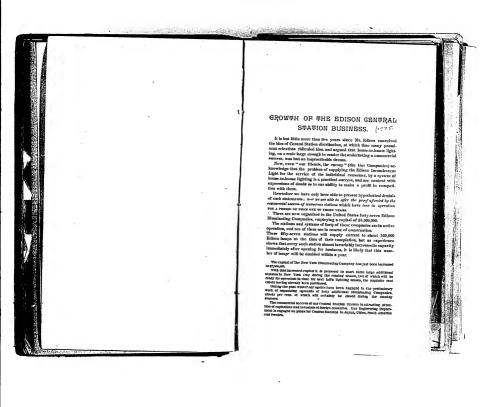
The fundamental principle is this: people have continued the use of gas while the price of krossene has been constantly declining, simply because of the superiority and greater convenience of gas, and for the same reason they will continue the nee of the inembescent light, notwithstanding may rechuetion experimenters may accomplish in the cost of producing gas. The possible uses of gas produced at a low cost will cover a broad field, but, as an illuminating agent, its mediness is limited; and, in the same manner as it took the place of kerosene, camiles, and other crude forms of light, it is now gradually but surely being displaced by the incandescent system.

Any further information may be obtained by calling upon or addressing

THE EDISON ELECTRIC LIGHT COMPANY, 65 Fifth Avenue,

New York.







angeneration and angenerate special state of the second and the second second second second second second second

The second and arrive managed trained from

During the past year much interest in the subject of street light-

Diring the past year muon interest in the subject or affect inguishing has been developed by our local companies.

The Edison light has been brought into strong conspetition with the systems of gas and are lighting, and has in the majority of cases. carried the day.

Street lighting contracts are very profitable, because they furnish a source of revenue during hours when the station would otherwise be running its minimum load.

The cost of production is only felt in coal, water, oil, and lamp breakage, widle other items remain the same as before, consequently the profits are proportionately larger. Two systems of distribution are used.

First, by special circuits and feeders in connection with the three-wire system.

This method can be used to advantage where the three-wire systens themson can be used to anymouse make the tension and lamps of any desired candle-power up to 250 candles can be obtained. The larger sizes of incandescent lamps will often be found as serviceable and more

satisfactory than the arc system. Szroxo, by the Municipal System, wherein the lights are supplied from a special dynamo.

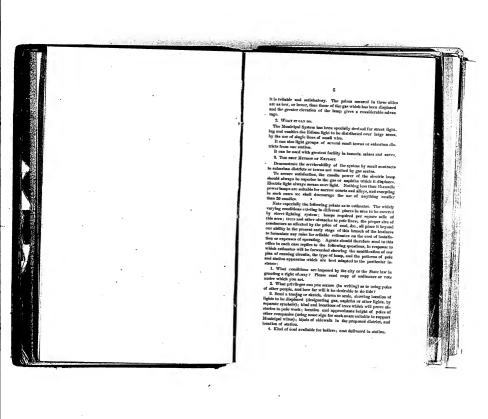
THE MUNICIPAL SYSTEM.

There are three points which will interest our agents: 1. WHAT THE MUNICIPAL HAS ALBEADY BONE.

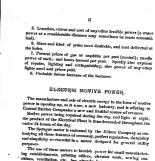
There have been seven installations made of this system, as foi-

	Number el Lamps.	Candle Power.	District Lighted.
Lockport, N. Y. Lockport, N. Y. Lockport, Mass. Lacksonville, Fig. lirosking, Mass. lenver, col. Lacking Canala.	550 550 550 150 40 500 500	16 A 32 10 to A 32 10 42 10 10 A 16 10 A 16	Ontakiris of City, I miles in length. Rottle city, I salls from Station. About 1 mile diameter. Through the City, I miles be city,

It will be seen time this system has already been applied to a variety of conditions, and its details have been worked out so that



International with an extended power provides the research of the power of



chines, ventilation, etc., has already become an established lu-Electric power is more satisfactory than stemm power; it is more easily handled, is clean, unlesdess, free from heat and requires no skilled labor; unty la fact be untile perfectly automatic. The charge for power should be governed by the cost of coal, water, labor and other licens entering into the original cost of pro-

The method of charge should be as he the case of steam, per H. P.

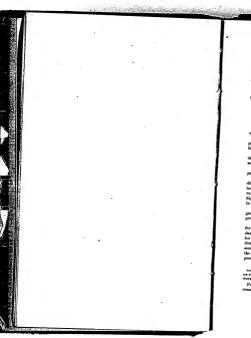
The range of prices will be from \$75 to \$150 per year per horse. The selling of motive power has the special mivantage of furnishing a bad, and consequently a revenue during the hours when the station would have its least land, were electric lighting its only function.

It is possible, under ordinary conditions, to self thirty per centurore harse-pawer than the station is furnishing, for the reason that not of a large number of consumers it will never occur that all maters connected will be required in give their maximum power at

duction of power in a central station.

of the motor's capacity.

the same moment of time.



7 For these and other reusons explained more fully by the Motor Company, the sale of electrical energy for power purposes supplies a convenient and cheap power to the consumer and a landsome revenue to the producer. (See Sprugue Electric Railway and Motor Co.'s printed matter.)

THE MAIN ARGUMENTS IN PAVOR OF THE EDISON LIGHT OVER ALL OTHER FORMS OF ARTIGIAL ILLUMINATION.

1st. The fact that it does not vitlate the atmosphere.

2d. That it does not destroy by deposit or otherwise decorative

work, paintings, &c. 3d. That it is not affected by variable air drafts or other atmos-

pheric coaditions, and is consequently absolutely steady and relia-ble in all places and hader all conditions. 4th. That any degree of brilliancy of a single nait may be had,

thus accommodating all uses and demands, and affording light of a superior quality.

5th. That the heat given off by it is so triding as to be senre-by

6th. That, being scaled within a chamber of glass, it cannot directly communicate fire to mything, and since the amount of directly communicate fire to asything, and since the amount of heat transmitted by the glass globes is so hiddiscional, a dire can only be caused by long-combined construct with materials of the highest hilamonability. It is, therefore, vastly the superior illuminant in the matter of safety from tire.

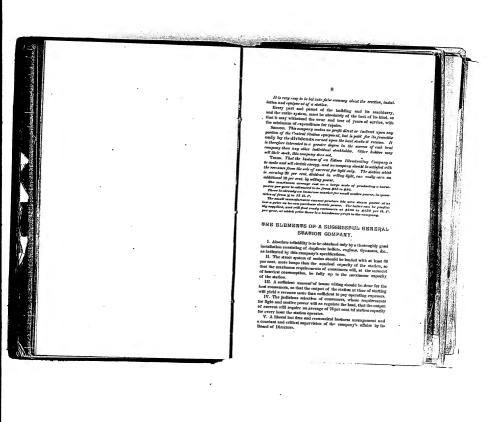
7th. That when produced upon a scale at all appraximating the gas output is a given locality, it can be manufactured and sold at a

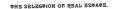
gas output is a given to cally, it can be maintactured and sold of a profit in direct competition with gas.

8th. That the apparatus employed in generating the electricity for its supply may be utilized during non-lighting hours (i. e., the daytime) for the generation of electricity for other purposes, such, for instance, as the supply of electric power; and this in competi-tion with steam or other forces and at such rates as will suffice, in some lastences, to cover the whole cost of operating the station for the twenty-four hones, thus leaving the receipts for light as acl

THE STOCKHOLOGES AND DIRECTORS SHOULD, AT THE OUTSET OF FORMING THE STOCKHOLDERS AND WIRECOMP SHOULD, AT THE OUTSEY OF FORMING AN EDISON ILLUMINATING COMPANY, GET A FEW FACTS FIRMLY FIXED IN THEIR

Finer, An Edison Light Station is an establishment to be so constructed that it will endure for at least a generation.





This is one of the most important matters with which the Local Company has to deal, and many details in connection therewith must be carefully considered before the than decision is unde, as a mistake in this matter at the putest, directly affects the set careful expectly of the station turing the entire term of its existence.

We know of one station where the selection was so unfortunate that a new property has been purchased 1,200 feet neuter the centre of instribution, the entire station remared and rebuilt, and a new system of feeders put up, all to overcome the distributions with which the station existed bit sold location; and of another which will probably soon be clumped at n cost of upwards of \$100,000.

Primarily the cost of a lot, added to the cost of copper required in the feeders (to carry the current to themsins), determines the ne-

tual value of any given piece of property.

The geographical centre is very often not the centre of illusti-

mation.

When you get away from this latter centre, the cost of copper increases as the square of the electrical distance, and a lot within 500 feet of the centre may be cheap at an apparently high perice, while another, a few humbred feet away, be coady at a very much

less price.

In selecting a lot, give careful consideration to the following important matters, which, as they affect the actual operating expenses as long as the station exists, are of vital importance.

WATER PAGILITIES.

If possible, get near a stream of good pure water, or in a location where a reliable well of large capacity can be put down for a rea-

where a remain war of mage capacity was assumible tigore.

The cost of water (taken from city mains) will average as high as from one and one-half to four per cent, of the total monthly

operating expenses of a station. A good driven or gauge well will usually furnish a sufficient water amply for gill the holdens in a station. If a surplus supply is obtainable in sufficient upnotity, it can be profutably utilized for purposes of condensation, and thus save at least 15 per cent. of the fact required up howe-power.

GOAL TRANSPORTATION.

It is desirable to have the lot so located that the cariage of coal is avoided. If a railroad aide track can be laid to the lot, this cost



Saild ground is absolutely accessary, so that substantial foundations may be creeted and vibration avoided.

He sure to uvoid swampy or mucky solis, or filled-in ground. The fullnwing are desirable, in the order mentioned: hard gravel, solid earth, rock.

A corner lot, or one with an entrance to the side or rear, should always be obtained.

By reference to the plans it will be seen that stations of from

by reference to the plants will be seen that stations of from 90 lights to 1,900 lights enjacity can be exected and conveniently nranged on a lot 30 feet by 100 feet; but simple facilities for the delivery of coal and the removal of aches should be provided.

For stations of larger capacity a lot 50 feet by 100 feet should be

If may doubt exists as to which is the most desirable property far the purpose, we would suggest that a map be sent us abowing the location of several available plots, with a description of their advantages and prices, and, after looking over the canvans of the district, we can resultly determine which is the best selection.

STATION BUILDING.

This should be of the roost substantial character. Nothing less durable than a well-constructed brick building should be used. It is false economy to put up a cheap frame building to effect a

saving in first cost.

A building of this kind can only last a very few years under the most favorable conditions, and is always liable to destruction from

ENGINES.

After years of experience in the business of electric lighting, we are figured engines.

we are flux advocates of light-speed engines. In a split of fairness, we have during the past two years cadeswred to pursue a liberal polley in our Central Station practice, and have permitted the use of such light-speed engines as might be selected by each local company. The results above that the polley

has not been a wise one, and such head companies as have adopted engines heretefore matted in our basiness, now find that their stations cost more in operating expenses for cost, oil, rater and repairs, etc., than stations using engines specified by us.

HIGH SPEED VS. SLOW SPEED FOR ELECTRIC LIGHT STATIONS.

The Edison Campany were the pioneers in adapting high-speed engines to Electric Lighting. The success of our sethods has induced many rivals to follow in our footsteps. Others have, however, contended that we were

wrong.
For reliable and economical Centrol Station Service
in engine power, several important features are aksolutely essential.

solutely essential.

1st. The most direct application of engine power to dynamo palley, without the intervention of morces-vary stoffling and belting.

2d. Several small naits, which taken together make up the maximum power, and taken separately easile the station production of even the minimum of corrent to be obtained with high economy.

These small units also enable us to Increase or decrease the station output on very short notice. 3d. The intuinium of Investment to scenre the outs-

imms of power supplied to the putley of the dynama. The strongest reason injud in faror of ston-speed eightes is the coring in coal; but It most be evident even to the most easied observer that coal is not an all-important item of the cost of operating a statium.

Our statistics show that the cost of each is only from 13 per cent, to 20 per cent, of the cost of station opcration: therefore, the slow-speed engine must make

its suring on this percentage of querattag expenses, When we came to the diseases of the Ragina Queelin for our large Uptown Stations in New York City, we assumed that her the scale of operations would be sufficiently argue to wurrant the new of slow speed rughnes, providing the slawing for economy was in their form.

We want an exhaustive analysis and examination of the whole to subject, and when we came to taskene the systing in fart, dailed to the interest on extra investment in a slow speed plant, against the extra quantity of fact reset by high speed, together with the matter of facility of quick expansion and contraction of output, we found the results in dollars and cents in favor of high speed.

Our Committee on this subject was composed of competent and expert men with outside consulting engineers, favoring no particular class of engines, and the voic with one exception was in favor of high speed.

This Company therefore thuis, after six years' practice: Finsy. That high speed engines are the most economical, reliable and generally hest adapted for Central Station Service; and Second. That he position on the question is sustained by a competent expert tribunal after an exhaustive investigation and con-

sideration of all the elements in the problem.

It is in fart the true and only may to chocky approximate a reservor or storage of electricity.

WATER-POWER STATIONS.

We now have neveral Central Station Companies where the dyname, are driven by water power; they are control monay our most succeeding reasonies, and not precisely variously methods of they even and impossible. The character of the water power, its distance from the centre of electrical stretchards, its reasoning and reliablely at all measons of the year, the popularity of water per mainter, the bright of all, etc., are all points of with imposing a stretchard of the stretchards of the power of

time, which hast in correctly investigated previous to every any contribution. It is a silicate where we describe the property of the property of the silicate which is the decision of the silicate which is the decision of the silicate which is the decision of the silicate which is considered by the silicate which is the sili

perfectly valide-ency and we ended thus to be the unit wavefulties to review the state of the perfect of the greater distance than where steam is used.

REPAIRS.

Where a central station plant is constructed in a proper manner, and is posed of the telesconductors, rugines and dynamics, and these are set up in Let The sank their participation and Daily

....

the manner prescribed by this company, and fundied and aperated by compo-tent men, there is no reason why the cent of regular should for many years be greater than in old established manufacturing plants couplinged in other industries.

In order in get some definite information on these matters, we have care-tally inquired of all our Local Companies as to what amounts they have ex-pended in require since the starting of their stations.

BOILER REPAIRS.

In eighteen stations the total cost af repairs has been one per cent, an tho in significations the total cost of regalization leen one per cent, at the value of the botters. As the botters are a part of the apparatus ascer liable to depreciation from ordinary wear than ofther engines or dynamos, we always estimate ten per cent, for depreciation and regalize.

ENGINE REPAIRS.

it is a well-known fact, that the older school of engineers who are wedded to show speed engines have placed the argument against the use of high-speed engines have placed the argument against the use of high-speed engines that, because they run so tast, they would were out account, and must

be repaired oftener.

While we freely admit this to be a fair argument, and one wide's would fully apply to that class of high-speed engines which are built to look well, and for the feats, money, and are composed of the process fasterfals and week-mandship, we hold that it does not apply at the process.

regimes.

In all of the stations from which we have reports, we that that the total cost of repulm to cogizes where its mathem statistic has only form one and ourself error ends to test act out the capies.

The analyze part of this exposed has been conveniented in two station, and where these absumand constitues are are cumied, the root is returned to leave these absumand constitues are not cumied, the root is returned to leave the content of the root in returned to the station of the content of the root in returned to the content of the root in returned to the content of the root in returned to the root in returned to the root in root in cent, per year.

REPAIRS ON DYNAMOS.

To the inexperienced person the styramo-machine is a majorery; the high speed at which it operates based the anon-expert to believe that the swear and ican maste be exposed; but in the experienced mechanish its at oncemparate that the anomators is the only moving part, and that all the way is concritated in the two barriages, and at the communitator. We admit that necessaries have buyeness there improved to our dynamos, and that occasional reports have been made.

The total root of repairs of all kinds is only .000 per cent, of the color of

the dynamous. We shad that the Babbitt bearings are good for sive years' service; that the commutator will, with good enry, last at least three years, and that a set of besides with, with groper attention, last six models.

We estimate the a recruy depreciation and repairs on dynamos to be not more than three per creat, per annum.

DESCRIPTION OF STREET SYSTEMS.

It is inoportont that the Agent carefully describe and explain the difference between the feelers and mains of a system of street

The Mains ore the conductors which racelly throughout all partions of the district to be served with current, and are those conductors from which the supply of electricity is delivered to the consumer; all lamp services are taken from the mains.

The Feeders are the heavy conductors leading direct from the station to specified points on the usins, and conduct oil the current to the latter. Lamp services must never be taken from the feeders.

POINTS OF ADVANTAGE OF THE EDISON "THREE-WIRE" SYSTEM.

Two absolute essentials in any system of electric lighting upon a comprehensive scale never to be last sight of are as follows:

18t. An independent unit of light, t. e., each tamp in-

1st. An independent unit of tight, t. e., each lamp independent of every other.

2d. The teast possible investment to conductors con-

2d. The teast possible investment the conductors conststent with the possession of an independent light unit and with safety and reliability.

This was solved by Mr. Eilion in the Invention of its "3-Wire" System, in which is employed a higher electrical pressure for the exterior than is employed for interiors, and which yet affortis an absolute individuality of each imap.

The original "Multiple Arc," or "Two-Wire" method of distribution required copper in the conductors in the proportion of 100 to 37½ to the present.

The (seasilest) "2-8.Wire" Sparm is in restly on evoluted to the use of three wires, four or five, we can greater number, may be employed, and each added wire being a material reduction of the interest of the control of the control

The listory of the art the post five years likewise affords ample proof of this, in that the Edison Swire stations are malque in their practical and commercial success. All other methods of distribution upon a large scale have proven absolute fullares. -----

An exhaustive examination and analysis of the whole subject of electrical distribution from central stations had for the purpose of deciding upon the specifications for the three new stations of 24,000 lights each, now in course of preparation in New York City, resulted in the mannimous confirmation of the "3-Wire" System.

This Company therefore offers as its recommendation for the immediate future the "2-Wire" System as the only one yet found practicable and commercially successful.

OVERHEAD POLE LINES.

 $\boldsymbol{\lambda}$ large number of our stations supply current through overhead

or pole line circuits.

This method has been adopted because of the reduced cost of original installation, but we consider it lacking in that element of permanency, which is of the atmost importance in the economical maintenance of the plant.

The choice between the overhead and underground pines should be determined by the feeling of the people regarding heavy pole lines in or near the principal streets, the existence of present lines, or rows of trees, the feasibility of placing poles on private land, along the rear lines of private property, and the prospective size of the system. Very few cities can be adequately served by overhead systems. Housetops should be avoided, and poles, when used, should be only from 90 to 110 feet apart, for heavy lines earrying feeders. The overland conductors, if adapted to the place, will cost from one-quarter to one-third as much as the underground.

UNDERGROUND CONDUCTORS.

The Edlson System +f Underground Electric Tubing is used by many stations is this country, and also in foreign countries. There are nor fifty-four miles of this six'en in did'y use, equal to one lamdred and sixty miles of ordinary cable.

The conductors are thoroughly hisulated, and enclosed in heavy wrought from tubes; special provision being made for perfect electrical connections throughout.

The Eillion system of underground conductors is lated upon the principle of "sectional construction," the lines being numle in the factory in acctions, each complete in itself, the work of ronstruction in the trench being confined to joining the completed sections together.

The iron tubes are used in lengths of twenty feet, and in the completed sertions as rande in the factory,



The street joints between aurevelve sections are than at dis-tances of twenty feet are some multiple of twenty feet spars, accord-ing to demonstrases, and are desired in test from boxes fastered to the tunes and their within soluting compounds.

The street is a street of the street of street of the street of st

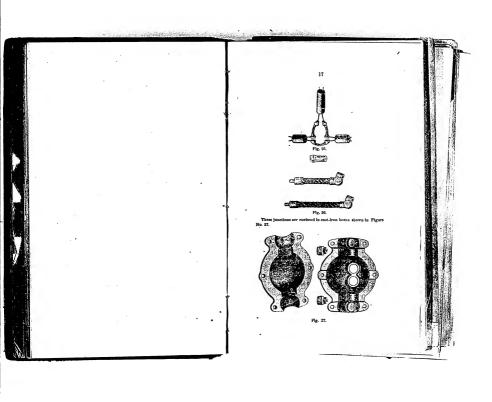
(Sectional view of Edison 3-wire electric tube.)

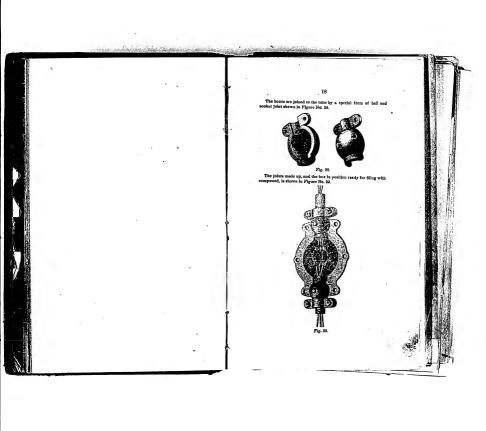


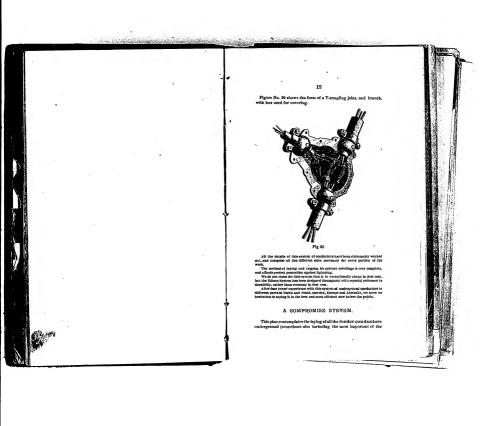
This system of underground conductors permits of great flexibility in making circuits, using a wide range in sizes and capacity

All rectrical connections are made by means of flexible copper cables; this method of making joint is shown in Figures No. 24 to









main conductors), and the general system of mains erected on

With this arrangement the heaviest copper is inid underground and is safe from accidental damage, and the similar nod lighter wires only are on poles, thus rendering the system ies objectionable on the score of appearance.

We how several statious using this plan and it proves to be very

We have several stations using this plan and it proves to be very sotisfactory; it also in a measure meets the demand of underground wires, without a too great cost.

METHOD OF SELLING LIGHT, -- METER SYSTEM AND GONTRAGT SYSTEM.

"Shall we sell the light by meter or contract?" is one of the

leading questions asked by Local Companica.
We reply that both systems have their special advantages.

THE EDGENN METER IS DELIABLE, AND THE METER SYSTEM NOT EX-PENSIVE TO HANDLE, WHEN IT IS PROPERLY BONE BY PERSONS WHO WILL EXERGISE DEDINARY CARE, AND WHEN ANY CONSIDERABLE NUMBER OF THEM ARE PSED.

IN OUR JUDGMENT IT IN THE MOST SATISFACTORY AND BELIABLE METHOD BOTH TO THE CONSUMES AND THE COMPANT; WE WOULD NOT HECOMMEND ANY OTHER METHOD TO LARGE COMPANIES.

The contract system has developed one element of weakness; it has been the general complaint that consumers would keep hearing for many hours longer than hash keen agreed upon with the company, thus increasing the quantity of end consumed, and long the home previous development of the consumed, and those the consumed, and the consumed that the consumer consumer

company.

By a change in the terms of the contract already made by some companies, whereby the consumer is charged for hungs broken, we outledpast that this element of weakness will, to a certain extent, be challenged.

As soon as the consumer has a moneyed interest in the consumption and life of the lousp, he will tend to economize in its use. The contract system gives a Local Company a strong basis on which to compete with gas and enables it to accure enstoners rapidly mu shout the same bests as former gas bills have weenged.

A clear contract for the purchase and sale of the light, enables the company to closely estimate their mouthly profits, and the consumer always knows how much his light will cost him

For small companies this system possesses the advantage of avoiding the expenses of the outfit of meters and appliances, and of reducing operating expenses in this department.

We have many successful companies selling light by each

FREE WIRING.

We ethnicly advise every Local Company to wire at its own expresse a supplicant numbers of first obstoners, to append such a retexue as will yielh a purpit phon the prist stanting of the station.

This shows candidence on the part of the Local Company, it is a special inducement, and canables the company to secure good contracts with desirable consumers, for terms of from one to five years, and the added investment is not great.

RATES FOR SELLING EDISON LIGHT.

We do not advise that the light be offered at a lower rate than gas, except la extreme cases where gas is very high in price. The main arguments in favor of our light are its superior quality,

The main arguments la favor of our light are Its superior quality, liss askey from far, la greater brilliancy, absence of least, freedom from motions wapors, freedom from deposits so destructive to decorations, &c., and for three reasons its better adaptability as an artifield illuminant, and its wider range of application in all positions and for all purposes that artificial light may be needed. By virtue of these points of supporterity, even

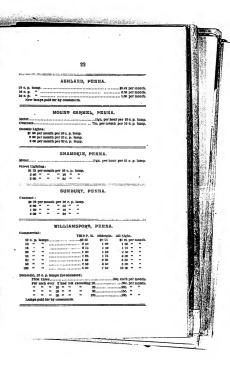
By virtue of these points of superiority, even though selling nominally at the same price as gas, it is really much cheaper.

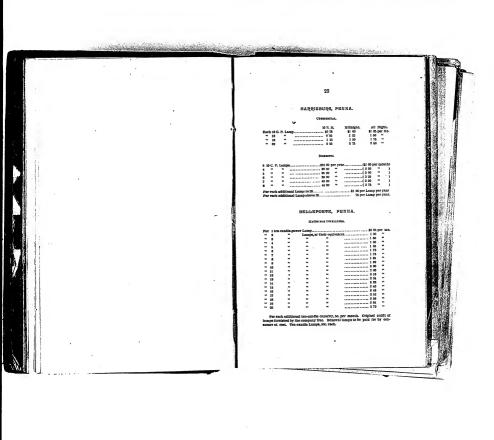
We give the following tables of rates of several companies, both on contract and meter basis:

HAZELTON, PENNA.

ФАМАQUA, РЕППА.

Commercial :	7 O'ctock.	9 O'ctock.	Midnight.	All Night.
10 c. p. lamp	\$0 69	gn oo	\$0.75	\$1 00
15 C. D. "	0 60	0 75	1 00	t 30
	0 75	1 00	1 23	100
	1 50	2 00	2 50	3 20
	2 25	3 00	8 73	4 60
Domesto:		10	c. p. Lame	Standard.
1 larap			Ge, per mor	th each.
2 lamps			10c #	**
3 **			190. **	**
4 #			20m H	**
6 #			He. "	**
And 10c	per month for ever;	nddiilonat	lamp.	





EFFEGW OF EDISON LIGHT ON PRICE OF CAS.

STATION.	before Company was organized.	Present Price of Gas.
Appletoo, Wis. Brockton, Mass. Brockton, Mass. Brockton, Mass. Brockton, Mass. Dos Mohare, Bova. Bos Mohare, Bova. Blozdeton, Penna. Fall River, Mass. Lawrence, Mass. Middletowo, Ohlo. Newburgh, N. Y. Piqua, Ohlo. Titlis, Ohlo.	2 75 7 00 2 50 7 25 2 55 2 25 2 25 2 25 2 25 2 25	\$2 00 2 00 3 00 1 75 2 10 3 50 2 00 1 50 1 50 2 00 2 00
York, Penna West Chester, Pa	2 00 2 70	2 00 2 50
Average	82 50	\$1 00

Average reduction, 20%. .

PREPARATION OF MAP AND GANVASS OF TOWN.

As accorate city or town map should be secured, showing all the blocks, streets and alleys of the district which it is proposed to transverse.

This comp should be accurately copied on tracing cloth on a scale of 100 feet to the Inch.

The names of all the streets and alleys should be distinctly writ-

ten in their proper places.

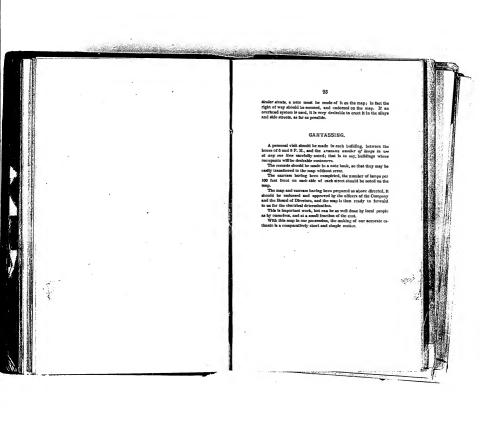
When this is done the face of each block should be divided off loto sections of one innuired feet front, and the fractional part thereof as the blocks only measure.

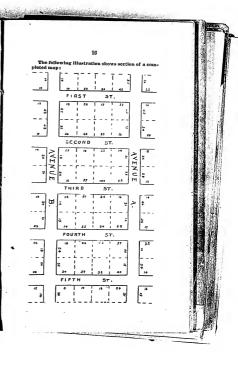
It is hoportant that the map be accurately made to the seale we have stated, and that great care be exercised in the correctness of details.

If either or both sides of the street are obstructed by trees it joust he so indicated on the map.

The character of the soll—rock, sand, gravel carth—should be ooted for each atreet; also the kind of pavement.

If any restrictions exist, or are likely to appear against the right of way for underground conductors or overhead system in any par-





CAUTION.

To more on exact price at which this company will install a plant, will be every case necessitate a cureful survey of the district to be lighted, and an accurate estimate and determination by our Engineering Department.

The estimates furnished in the following pages have been prepared with great care, and with a careful application of our experience, derived from the construction and operation of all the central stations now in existence, and they are as nearly accurate as it is possible to provide, yet they are merely approximate estimates, and must not be construed as offers for the cost and construction of any station, but as a guide for the agent in arriving at the amounts of enpital requisite for a station of a given size with a reasonable degree of accuracy, and thereby to effect the organization of a company and secure the necessary subscriptions to the stock, before going to the expense of making the final survey and determina-

The agent will readily understand that if the Local Company elect to make their own purchases of these supplies, and contracts for the work, that some saving may possibly be made on our esti-mate of cost. But in any error the noterials and workmuchip must all be in accordance with our specifications and subject to our inspection.

The Remized details of these estimates will be supplied in all cases where a local campany is organized and prepared to execute their contracts.

We append one estimate in full detail, showing all the different

The filmen Company have spent a large amount of capital la perfecting. The filmen Company have spent a large amount of capital la perfecting recumstated accurate antients, and data, and seed rathable experiences in the late large antient of actions to the company of the capital large spent of the capital large spent

no our observed.
We consider that every piece of inachturry specified is absolutely essential to
the reliability, sufety and economical operation of a station.

As stockholders in each local organization we have given careful nttention to all of these matters, because excessive depreciation effects direct reduction in our dividends, and with all these things in mind, we have prepared our sprelifications with all possible care, and we believe with a liberal spirit of fairness.

ESTIMATE No. 1.

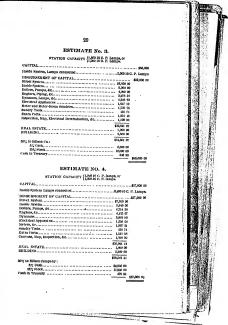
STATION CAPACITY [000 10 C. P. Lamps, or

CAPITAL		\$35,000
Inside System, Lamps connected	1,200 10 0	. P. Lamps
DISBURSEMENT OF CAPITAL		\$35.000 00
Stret System	. \$1,250.00	
Itsido System	2,001 00	
- Hotters, Pumpe, &c	3,184 50	
Engines, &c	2,59t 21	
Dynamos	3 185 60	
Electrical Apparatus	1 311 38	
Meters and Meter Appliances	t.:592 06	
Similary Tools	436 74	
Extra Parts	430 /4	
Later Parties	839 55	
Inspection, Map, Electrical Determination, &c	CCG 00	
	\$21,000.00	
REAL ESTATE	900 00	
BUILDING	2,000 00	
30%; to Edison Co. :	4,000 00	
B## Cash	t.750 00	
237; Stock	8,759 00	
Cash in Treasury	694 91	
	UP5 VI	\$35,000 00
		£20,000 to

ESTIMATE No. 2.

STATION CAPACITY \$1,280 ID C. P. Lamps, or 800 IO C. P. Lamps.

	(ico acc 1. tampe	
e,	APITAL	\$10,000
In	olde Nysteus, Lamps connectedt,500 10 C.	P. Lamps
. Si In Be Er Dy Ei Ne Su Ex	reck Rysteen	\$47,000 CO
In	spection, Maps, Electrical Determination, &c 825 00	
	22, 181 51 20 20 20 21 21 21 22 22 22 22 22 22 22 22 22 22	
	tg to Edition Co.; \$27,681.51 5 vg in Cash. 2,000.00 5 vg in Cash. 10,000.00 sk in Trensury 18.49	
		\$10,000 00



ESTIMATE NO. 5.

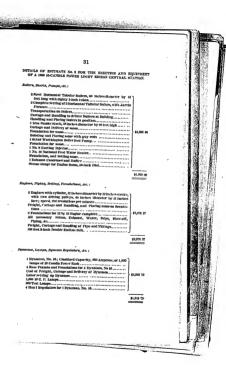
TATION CAPACITY \$2500 10 C. P. Inimus. or

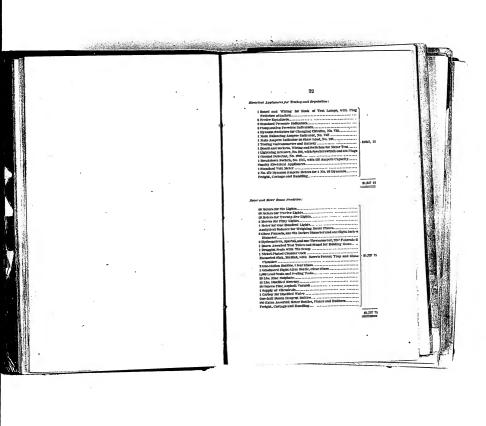
STATION CAPACITY (2,500 to C. P. Inimps, or (1,500 to C. P. Inimps,	
CAPITAL.	
CAPITAL. Inside system, Lamps connected	
Bellen State .	. 170,000 co
Deside Winds	
Inside Wirting 7,800 00	
Street System	
Canvans, Inspection, &c	
\$15,185 55	
REAL ESTATE L300 00	
HUILIUNG 2,600 00	
D'; to Ellera Chinpany;	
6½ Cash	
25% Nock	
'esh in Trussess	
Cash in Treasury	ero ono on

SEPTEMATER NO. O

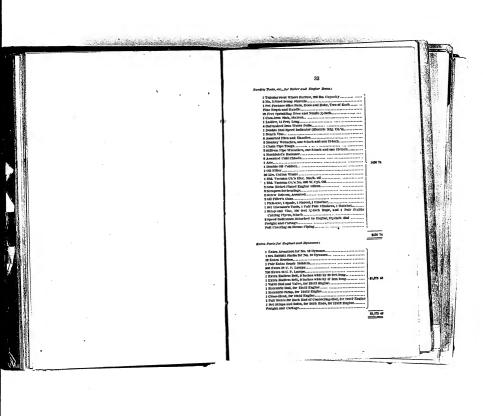
ESTIMATE NO. 6.	
STATION CAPACITY (2,30) 18 C. P. Iamps, (2,00) 16 C. P. Iamps,	or
CAPTAL. Land INSTANCE OF CAPTAL. Land INSTANCE. Land INST	
HRAL ENTATE	1,500 to

Estimates for stations of larger capacity for special cases will be furnished upon application to our Engineering Department.





Ü



for Witing and Service Connections to Balldings;

rion w tring and Service Quarettous to Balldings: All Neconstry, Wire, Citesta, Souddings, Marty Bavices, Nwitches, Key or Keyless Nockets, Plinish Coudactors, Shankes and Hadd-ers, Switches, Lados, Rec., Ric., Toc., to Wire Piris Customers, to T.000 Lange, at F2.50 per Lange. . \$5,000 CO

En En En Me Me Ex Int Btr

All necessary Poles, Wire, Gross-arms, Etc., together with all Labor of renaing and putting up, nor 2,000 Lamps, at \$5.50...... \$5,000 co ressing and Starting Station, Instruction, Labor and Inspection:

Cost at Canvass and Esthantes, Expenses of Persuan, Engliser, Electrical Report, Ballroad Fares, Incidentals, Etc.

HECAPITULATION.		
ters, Smck, Pumps, Etc	\$1,000	10
rines, Piping, Belling, Etc	3,106	27
names, Launes, Branno Begutators, Ebc	4,916	
ctrical Applicances for Testing and Degulation	1,747	13
eers and Meter Houn Sundries	1,727	75
sdry Tools, E.C., for Botler and Engine Bottom	438	
tra Parts for Engines and Hymnuos	1,775	
to ACtring and Service Connections to Datidlu24	5,000	
ret Installation	. 6,000	00
synandray, and Starting Starting, Instruction, Labor and Inspection	1,100	00
Total	139,003	
		-

We invite the particular attention of agents to some important matters in connection with these revised estimates,

We have so arranged our new plans as to divide the immediate or ultimate capacity of the station into engine and dynamo units of equa! capacity.

This arrangement uses ballers, engines and dymimos of duplicate sizes, reduces the first cost of Installution, and by having all parts alike the reliubility of the station is greater and repairs in case of accident more promptly made, with less expense. The improvements made in the manufacture of dynamos, ca-

gluesumi electrical apparatus have greatly increased their reliability. The careful inspection and supervision applied by us during the construction of the station and street system scenres the continual improvements so es-sential to the perfection and healthy growth of a

NUMBERS.

By reference to the load diagram, Fig. 208, it will be observed that the practical service of a station requires the use of the maximum capacity for only about two hours per day, of its double plant for a total of about live hours, and of one unit for the balance of the new business.

OPERATING EXPENSES, EARNINGS AND DIVIDENDS.

If the promalers of a company will turnish as with the fullest information and conditions under which a mation can be started, we will ascertain at the outset whether or no the conditions are inventile, and if they are, we will so Inform them and references.

The following tables are not estimated, saither are the figures specially prepared for this book, but they are copies of reports of the ACTUAL PACTS, and show the real cost of operation and the real carnings as derived from the mouthly reports of our stallous. For obvious reasons the names of the Local Companies are not given.

The original reports are on file in the hame office.
STATION No. 1.
m January and Pabruary, 1994
Cartral, \$100,000.

· Average Lampa connected, 1937-10 c p. Average Itua, 21 tiaurs per day. AVERAGE EXPENSES, " " :

\$1,819.75 Average Profit.....

ACTUAL PROFIT, 21% per cent. per manus. Labor includes all salaries of every kind.

STATION No. 2.

(Par the manths at July, August, September, 1885, and January, Pebruary, March, 1885,) CAPITAL \$50,000.

Average Lamps connected, 229-10 c p. Lamps. Average itsis, 17 hours per day. AVERAGE EXPENSES, " . " :

Average Profit.....

ACTUAL PROFIT, 885 per cent, per numum.

STATION No. 8.

November and December, 1883. January, Pobruary, March, 1886 CAPITAL \$31,000. Average Lamps connected, 1835-16 c. p. Lamps. Average run, 17 heurs per day.

AVERAGE RECEIPTS, PERI MUNTII.

AVERIAGE EXPENSES " | 1,822 15

Coal | 1,8

ACTUAL PHOFIT, 8, 67 per cent. per annum. STATION No. 4.

From tictober, 1985, to February, 1986.....

CATSTAN propose.

Average Lamps connected, 2021-10 c. p. Lamps.

Average Itun, 21 hours per day

AVERAGE EXPENSES " " :

Average Profit.....

ACTUAL PROFIT, 1115; per annum. STATION No. 5.

From July 1888, to February 1888...... 8 months CAPITAL \$15,000. Average Lamps connected, 3019-10 c. p. Lamps.

Average itun, 17 hours per day.

AVERAGE EXPENSES:

TOTAL AVERAGE EXPENSES, PER MONTH..... Average Profit.....

ACTUAL PHOPITS, 7.56% per nanum.

27

ATION No. 4

From July, 1865, to Prònusty,	1896	months
	CAPITAL \$21,000.	
Average Lamps connected, 1	1597—10 c. p. Lamps.	
	Average Bup, 14 hours	per day.
AVEHAGE RECEIPTS, PER	MONTH	5000 10
Coal	* ; \$77.05	.,,,,,,
Labor	160 00	
FOTAL AVERAGE EXPENSI	ES, PER MONTH	14tt 68
Average Profit	-	\$147.50
ACTUAL PROFITS, 7.39;; pe		-
8	TATION No. 7.	
from Pebruary to July, 1886		months
	CAPITAL \$10,000.	
VERAGE RECEIPTS, PER 3 VERAGE EXPENSES, "		perday. 11,001 ±5
Conl	\$ 79 46	
Lamps		
Sundries	37 97	
Labor	274 58	
OTAL AVERAGE EXPENSES	S, PER MONTH	45 10
Average Pred	L	817 83
CTUAL PROFITS, ISSE per c	cent. per nanum.	

.

The following statements, copied from actual monthly returns of a company recently started, cleanly illustrate the grawth of a new station.

Particular attention is havied to the granium reduction in operating expenses, the increase in lumps connected, and the monthly increase in profits.

STATION 1.—NOVEMBER, 1883. CAPITAL, \$30,000.

remba connected, 1'0se' 10 C' 1.	Average hours per day, 17,
RECEIPTS	
EXPENSIS: Col. Oil and Waste. Lange. Starties. Labor. Later.	2076 29 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 51 51 51 51 51 51 51 51 51 51 51 51
DECEMBER, 19	<i>a</i> .
Lamps connected, 1,767; 10 C. P.	Average run, 18 hours per day
BECEIPTS	and the same of the same of
EXPENSES:	1625 09
Coal Coal Coal Coal Coal Coal Coal Coal	47 79 187 05 90 36 227 39 ————————————————————————————————————
JANUARY, 1880	
Lamps connected, 1860; 10 C. P. HECKIPTS.	Average run, 17 hours per day.
EXPENSES:	
Ceal. Oil and Waste	
\$4 manth, profit	891 14

		ura per da
HECEIPTS		\$160 :
AXPENSES:		
Cont	\$20	0 47
Water	4	1 01
Oll and Wasto	4	5.03
Lampe	11	
SundriesLabor	6	3 05
Labor	10	4 63 \$478 :
		-
4th month, profit		\$191 7
		-
Actual net carnings first four months 450 per cent.		
The second secon		
STATEMENT OF YEARLY EARNING CAPACITY OF A	NO. 1 8	TATION,
Capital, \$25,000. Lamps cont	ntertest, 1.1	mo-10 c :
Meter Basis: Itate, 150. per hour for 10 c. p. hamp to per Each lemp is estimated to give 2 hours service per day,	trate con	Suners.
Station runs an average of 15 hours per day.		•
Station runs an inversge of 15 hours per day. YEARLY EARNINGS:		•
Station runs an average of 18 hours per day. YEARLY EARNINGS: Privote Consumers, 855,000 into hours at the		\$10,550 O
Station runs an average of 15 hours per day.		\$10,550 O
Station runs an average of 18 hours per day. YEAHLY EAIMNIS: Privote Consumers, \$56,000 into hours at 14c Street Lighting, 100 intops at 150 per year each		\$10,550 0 2,000 0
Station runs an average of 18 hours per day. YEAHINY EARININESS: Privote Concumers, 802,000 lamp hours at 14c Street Lighting, 100 lamps at 400 per year cuch YEAHINY EXPENSES:		2,000 0
Station runs an average of 18 hours per day. YEALIN TEALURINGS. Private Consumers, \$75,200 ising hours at 140 Street Lighting, 100 isings at 420 per year cuch YEALIN EXPENSION. Coal. 499 issues at 42	\$1,400 00	2,000 0
Station runs an average of 15 hours per day. YARIDY EARININES: Physic Communers, \$65,000 lamp hours at 1 ye Served Lightless, 150 lamps at 800 per year curb YARIDY EXPENSION: COL, and hous, at 84	\$1,440 00 113 00	2,000 0
Station runs an average of 18 hours per day. VEALINY EALINYMOST. Perfords Consumers, 552,000 lamp hours at 14c	\$1,440 00 115 00 607 00	2,000 0
Station runs an average of 18 hours per day. YEALINY EARININES. Firston Consumers, Carol long hours at 14c. Firston Consumers, Carol long hours at 14c. Firston Consumers, Carol long hours at 14c. YEALINY EXPENSION COM, 400 tons, at 43. Old mad Waste Long Demonsio	\$1,440 00 113 00	2,000 0
Hatdine mass as sevenge of 15 hours per day. YALIDY KAINISMESS Perfect Consumers, 65,000 home set 15,0 Series Liquidiss Perfect Consumers, 65,000 home set 15 per your curls. YEARLY X. SEVENDED; One, on those, 15 One, on those,	\$1,440 00 125 00 667 00 36 00	2,000 0
Ballin mas a swrege of 15 hours per day. YARINY EARNINGS: Petrode Communes, 65,070 hours hours at 14c. surver Lighting. 10 hours at 15 per y our contain. YARINY EXPENSION: Coat, 400 from at 15. Office of Variety and 15. Offi	\$1,440 00 115 00 667 00 36 00 360 00	2,000 0
Beddien runs an average of 18 hours per day, YEARINY ZAINNING: SALVO house postern at 14c. Private Consumers, 86,200 house postern at 14c. SERVEN LERGIALD (30 house at 450 per year earth. YEARINY EXPONSION; Coal, see its may at 5. Coal, see its may at 5. Lamp Research. Lamp Research. Lamp Lamp Lamp at 5. Lamp Lamp Lamp Lamp Lamp Lamp Lamp Lamp	\$1,440 00 115 00 657 00 36 00 360 00 800 00	2,000 0
Mattion runs as reverse of 31 fema per day. **LIMITE FAINTSMIN: Private Commune, 64,000 loop looms at 1/6. **Rever Lighting, 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **Paginate 100 loops as 100 per your cond **Report loops as 100 per you	\$1,440 00 105 00 667 00 36 00 366 00 360 00 900 00 720 00	2,000 0
Matther muses as wronge of 18 hours per day. **LAMLE KAINNESS: Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Superioris 1 kgs. Laina 1 kgs. L	#1,440 00 112 00 607 00 36 00 360 00 900 00 900 00 720 00	2,000 0
Mattion runs as reverse of 31 fema per day. **LIMITE FAINTSMIN: Private Commune, 64,000 loop looms at 1/6. **Rever Lighting, 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **YLAINT EXPENSIVE. **CONTROL 100 loops as 100 per your cond **Paginate 100 loops as 100 per your cond **Report loops as 100 per you	\$1,440 00 105 00 667 00 36 00 366 00 360 00 900 00 720 00	\$12,000 m
Matther muses as wronge of 18 hours per day. **LAMLE KAINNESS: Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Superioris 1 kgs. Laina 1 kgs. L	#1,440 00 112 00 607 00 36 00 360 00 900 00 900 00 720 00	\$12,000 m
Matther muses as wronge of 18 hours per day. **LAMLE KAINNESS: Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Science Superioris 1 kgs. Priorio Commune, Superioris 1 kgs. Laina 1 kgs. L	\$1,400 00 112 00 657 00 36 00 300 00 900 00 900 00 720 00 800 00	2,000 0

Lamps connected, 1,500-10 c. p.

Capital, \$40,000. Meter Rads: Hate, Iye, per hour. Each lamp is estimated to be used 2 hours per day. Station runs an average of 15 hours per day. URLY EXPENSES: \$1,000 00
COAL, 501 COAL, 501 COAL, 502 COAL, 501 C YEARLY EXPENSES: Laton: 500 00 Superintendent and Electrician 500 00
 Superintendent and Executions
 900 01

 Chief Engineer
 720 06

 Assistant Engineer
 600 00

 Pirenam and clueral lielp
 600 00

 3 feedbaseoss Work
 20 00
 10,291 15 Percentage of Profit on \$40,000 capital, 23,1334. STATEMENT OF YEARLY EARNING CAPACITY OF A NO.2 STATION. Lamps consected, 2,000–10 c. p.

Cupital, Expen.

Neter Basis: Rate, 14c. per inc. p. R. Such lamp is estimated to be used only 2 hours per day. Station runs an average of 15 hours per day.

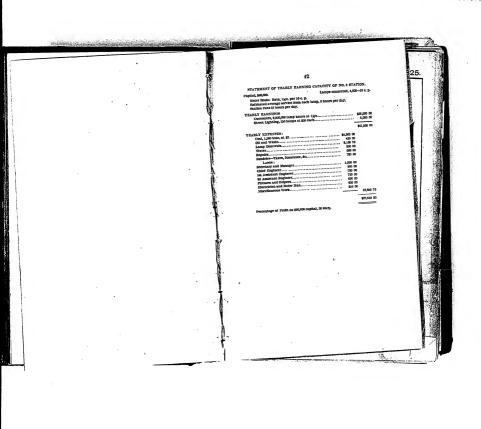
YEARLY EAUNINGS: Scertary and Mausger.
Cliff Kagineer.
Ansistant Kagineer.
Fireman and Helper.
Electricha und Meter Man.
Misrellamoous Work. 300 00

\$12,750 15

Percentage of Profit on \$55,000 capital, 25.5167;.

STATEMENT OF YEARLY EARNING CAPACITY OF A NO. 4 STATION. Laterpa connected, 2,400-10 c. p. Cuptuil, 187,000. Meter Bishs; Hate, 13G, per 10 c. p. lt. Each lump estimated to be used 2 hours per day. Station rins 81 hours per day. YEARLY EAUNINGS: YEARLY EXPENSES: 10.644 00 \$14,856 00 Percentage of Profit on \$57,000 capital, 20,002%. STATEMENT OF YEARLY EARNING CAPACITY OF A NO. 5 STATION. Lamps connected, 3,200-10 c. p. Cupital, \$50,000. Meter Basis: Bate, 15cc, per 10 c. p. Meter marks: notice, 14th, per 10 to 15. Each knop estimated to be used 2 hours per day. Station runs 21 hours per day. | REY KARNINGS: | \$22,000 to | \$22,000 to | \$22,000 to | \$4,000 to | \$1,000 to | \$1,000 to | \$23,000 to | \$23 YEARLY KARNINGS: XHLY EXPENSES 1 E4.00 00 of classif Waste. 92 00 long set Waste. 92 00 lamp Brancake. 92 00 lamp Brancake. 92 00 long set Waste. 92 YEARLY EXPENSES: £21,123 15

Penventage of Profit on \$70,000 capital, 90.17%.



GENERAL MENTION

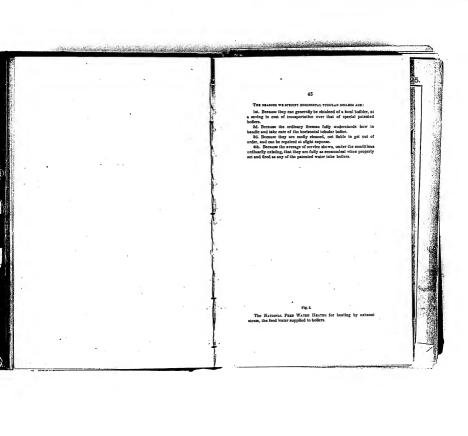
or

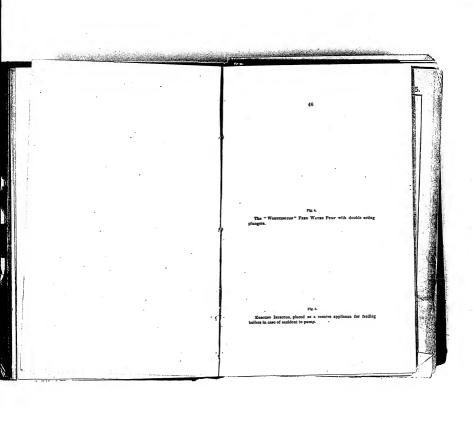
MOST IMPORTANT APPARATUS

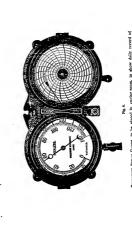
Required in a Central Station.

Fig. 1.

Sectional view of brick setting of horizontal tubular boiler, using







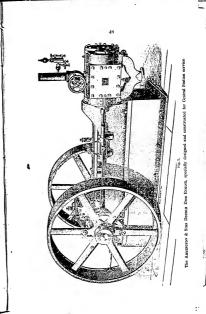
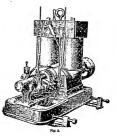
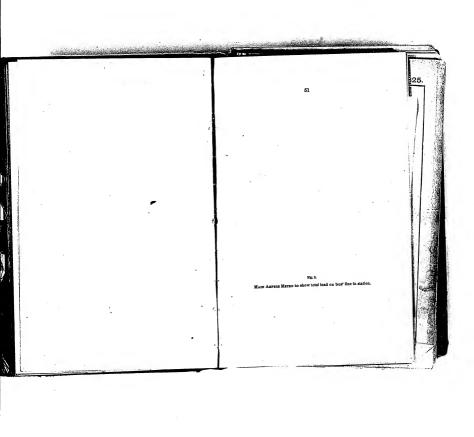


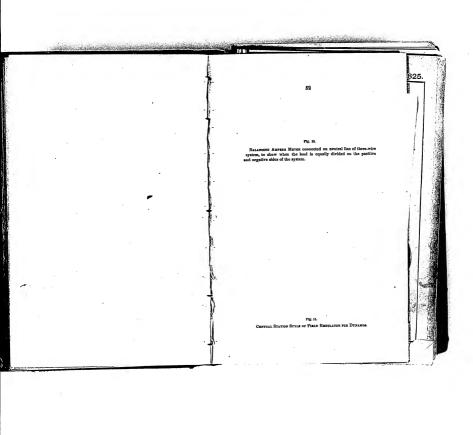
TABLE OF SIZES OF ENGINES FOR DRIVING EDISON DYNAMOS AT A BOILER PRESSURE OF 85 LBS., WITHOUT CONDENSATION.

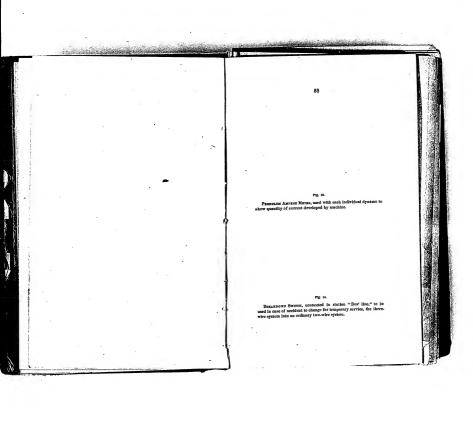
94	x	10	Engine	drives	two	No	0	Dynamos .
10}	x	12		**	**	**	8	erymanica.
12							10	
18	x	12	••	**		**	13	

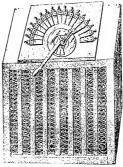


EDISON STANDARD DYNAMOS. Table of Siere and Capacities for Central Station Wore.



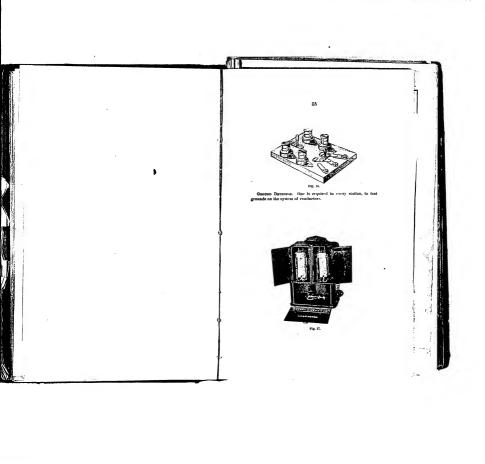


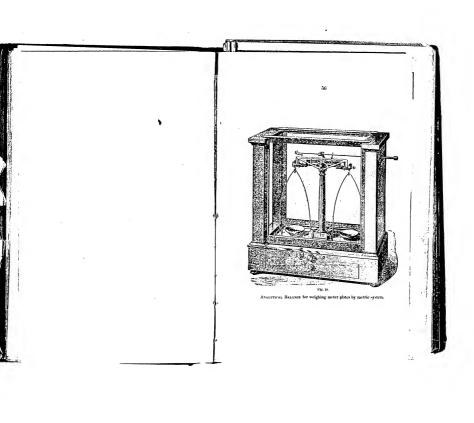


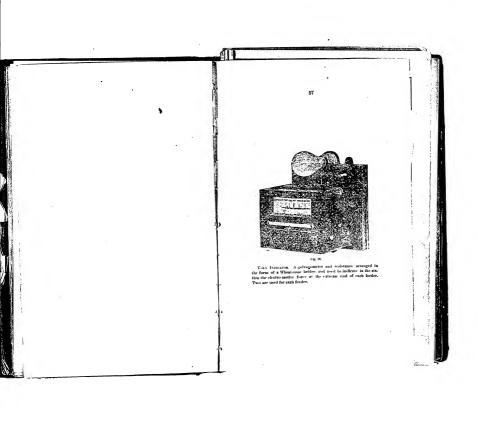


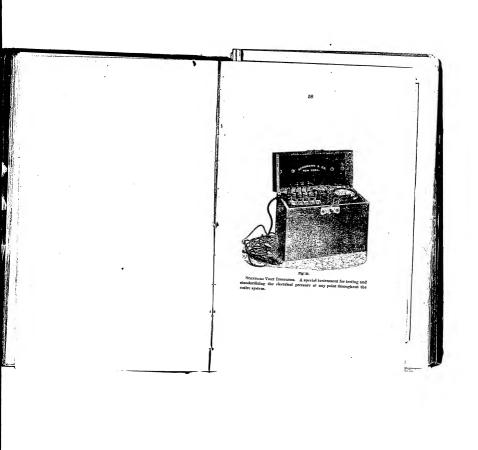
'Flg. 15.

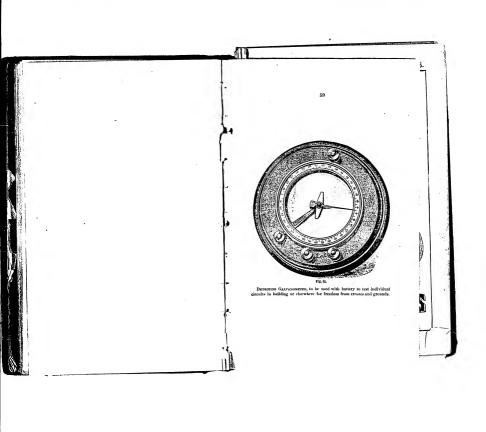
FREDER EQUALIZER, a special apparatus used with every feeder, to equalize the flow of current, and to maintain an even pre-sure on the main. Two are used for each feeder.











6213269-1

GHE EDISON SYSTEM OF GENTRAL STATION LIGHTING.

Stys Edigon Electric Right

* Company, *

Nog. :16:and:18: Broad: Street,

* New York City. *

Sacorro, 97. 917., Sept. 17, 1886.

TO THE PRESIDENT OF THE

LARAMIE ELECTRIC LIGHT CO.,

LARAMIE CITY, WYO. TER.

DEAR SIR :

Our people here are on the eve of granting a franchise to a company for the erection and maintenance of Gas Works, but are holding off for the purpose of more fully understanding the question of which is the best or most desirable light, GAS or the NEW ELECTRIC LIGHT?

An opportunity presents itself here for the investment of a few thousand dollars, which rarely offers in these parts, to a responsible party posted on this new light.

> Do you know of such a party ? Yours, etc.,

> > A. T. HARRISON& CO.

Wholesale and Retail: General Hardware, Stoves, Queensware, Mining and Agricultural Implements. M. H. GRANT, PRES. W. H. HOLLIDAY, VIGE-PRES.

R. M. IONES, SEC. AND MINOR.

Laramic Electric Gas Light and Fuel Company.

Laramie, Wyo., Sept. 21, 1886.

A. T. HARRISON & CO.,

SACORRO, N. M.

Your letter of the 17th at hand, asking about our electric light. We have had our plant in operation over two months and have got had one complaint from any of the consumers. It gives perfect satisfaction since starting; there have been mon here from many parts of the U.S., and thoug say without exception that they never saw a better light and very few claim that they have seen its equal. We have all of Edison'd statest improvements, so that it is even better than many other plants of the Edison (D. I consider the Edison light as much superior to gas, as gas is superior to a tallow candle.

For dwelling houses, villages and cities, or what is known as Central Station, lighting, the Edison, gastem, is the only one that I consider of any use. I would not have any other system if they would put in the plant and give it to me. Some of the other systems do very well, for what is known as isolated lighting; that is, where the electric light plant is placed in a large building and the wires not run outside of the building; I think the, Edison, light even botter for this.

We hear some objections to the Edison Company for the reason that they require all local companies to give them from 25 to 30 per coant. of the stock; this I consider one of the best features of the Edison Company. They give you the benefit of about 300 patents and of all inventions or improvements they may make or acquire by purchase without additional cost to your company. They also sell you all electrical goods to

at 50 per cent. discount. They require you to render a monthly statement of your running expenses, so, if there are any abuses or mismanagement, they send a man to your station to correct them. They, being interested in the local company, it is to their interest to do everything in their power to see that the business is conducted properly. Should you organize a company, they will send you men to put in your station, and run it for you until they can teach one of your men to run it in good shape. If you let them know how many lights you wish to furnish, they will give you the cost and will contract to put in the plant at their estimate. You will make a mistake if you do not contract with them to put it in at a stated price and turn it over to you in running order. We have in Laramie a population of about five thousand people. Our station will run 1,600 lamps of 16-candle power each and we are wired for 3,200, so we can at any time increase our plant at a smallexpense. We now have orders ahead to wire houses to the full capacity of our station, and I think that within 18 months we shall have to put in machinery to carry what we are now wired for, or 3,200 lamps of 16-candle power. In dwelling-houses only about one-half the lamps are used at a time, so when I speak of running 1,600 lamps of 16-candle power, I mean the number we can run when they are all turned on; so we can put in about 3,000 without any increase of power. We also use the Edison meter which is very accurate; we can tell within 1 1/2 per cent. how much light is used by each consumer; this I think is much closer than you can measure gas. I have referred your letter to the Edison Co., requesting them to give you further information. Before doing anything, I think it would pay you to come here and see our plant and light, so that you may know of the general satisfaction it gives. We will take pleasure in showing you around and in giving you all the information we can.

Very truly yours,

M. IN. GRANT.

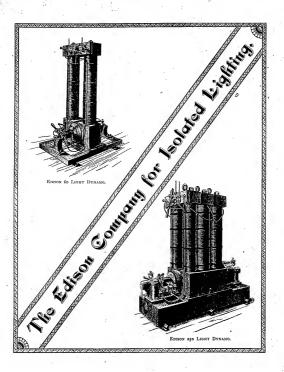
resident Laramie Electric Linht Co.

Edison Company for Isolated Lighting

This folder contains printed material issued by the Edison Company for Isolated Lighting. Organized in New York in November 1881, this company sold small generating plants for the lighting of individual buildings. It merged with the Edison Electric Light Company in 1886.

The following items have been filmed:

- "Prices of Edison Incandescent Electric Light Apparatus . . ." (1882)
 "The Edison Light" (1882)
- 2.
- 3.
- "The Edison Light" (1882)
 "The Edison System of Incandescent Electric Lighting" (1883)
 "Catalogue and Price List of Edison Light Fixtures Manufactured by Messrs.
 Bergmann & Co." (1883) [Bound with Item #3.]
- Annual Report (1884)
 "List of Edison Isolated Plants Installed Prior to October 1, 1885, in the United States" (1885)



PRICES.

EDISON INCANDESCENT ELECTRIC LIGHT APPARATUS

LIGHTING FACTORIES AND OTHER BUILDINGS.

F. O. B. NEW YORK CITY.

THE EDISON COMPANY FOR ISOLATED LIGHTING,

65 FIFTH AVENUE, NEW YORK CITY,

GENERAL MANAGER, M. F. MOORE.

In the following price-list the cost of the dynamo-electric machine, including regulating apparatus, extra brushes and the requisite number of lamps and sockets for "A" or "B" lights, is constant, while the cost for fastures and wiring is only approximate. The figures given, however, are drawn from experience in installing our apparatus, which, taken altogether, is spoken of as "plant."

The only depreciation on the dynamo machine is the natural wear of the Jearnals, commutators and brushes, which with ordinary care does not exceed one per cent, per annum. The lumps at their normal candile power are guaranteed to have an average life of not less than 60 so house their actual tide has been found in practice to be much longer. The cent of new lamps is one dollar each. The Edition dynamo converts into electrical energy 95 per cent. of the mechanical energy or indicated horse power of the engine or other motive power, and the Edition Systems of Leichtig convertible 85 per cent. of such original mechanical energy into light. These results are far in excess of those attainable by any other humon method of applying electricity to the production of light. The economy and efficiency thus attained make the Edition System south phosper than any other now known.

We can at any time make accurate estimates of cost of installing a plant, requiring only a detailed plan of the building or buildings to be lighted. This plan should show the proposed location of the dynamo, the location and description of the machines to be lighted, also the total number of lamps required. An elevation should accompany this diagram, showing the height of ceilings. On completion of a plant we allow one of our men to remain for a reasonable period of time, at our expense, to instruct the purchaser in its use: It may be run by any workman of ordinary intelligence, and requires no more attention than enough be given by any engineer without interfering with his regular duties. In our contracts abundant guarantee is given of the efficiency of the system, and we may add that we have entirely passed the experimental tager of our caterying, as may be evidenced by the large number of mills, factories, hotels, &c, in various parts of the contract where in successful corporation.

Any further information may be obtained by application in writing or in person.

THE EDISON COMPANY FOR ISOLATED LIGHTING.

65 FIFTH AVENUE, NEW YORK, September 1, 1882.

LIST OF "E" DYNAMOS NOW IN USE.

OWNER.	LOCATION.	BUSINESS.		urs.
Prof. Henry Draper Spencer, Trask & Co. Eastman Dry Plate Co. Prof. C. A. Young.	Albany, N. Y	Bankers	15	100

On account of the large proportionate cost of this machine, the use of the "E" dynamo has been mainly for laboratory and experimental purposes.

FLOOR SPACE: PULLEY:
25 x 17 1/2 INCHES. FACE, 3 Inches.
DIAMETERS, 5 INCHES.

HEIGHT:

2 FEET 11 INCHES.

REVOLUTIONS: 2,200 PER MINUTE.

WEIGHT: 700 POUNDS.

4 HORSE POWER.

THE EDISON "E" DYNAMO

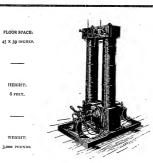
15 A LIGHTS (16 candle power), or 30 B LIGHTS (8 candle power).

ITEMS.	15 A LIGHTS.	30 B LIGHTS
One "E" dynamo-electric machine complete, regulating resistance, half dozen brushes, with lamps and sockets	\$500 00	\$530 oo
Fixtures vary in price from 75 cents to \$5.85 per lamp, according to style and finish. For common factory use the cost would probably not exceed 75 cents per lamp.	11 25	22 50
The cost of wire for conductors, cut-outs, safety-catches, and other accessories will vary with distance of lamps from dynamo, also with number of branches and disposition and grouping of lamps.		22.30
The probable average will be	50 00	90 00
	\$561 25	\$642 50

These prices are exclusive of counter-shaft, belt connections, and foundations.

LIST OF "Z" DYNAMOS NOW IN USE. .

OWNER,	LOCATION,	BUSINESS.	LA	MPS.
		BUSINESS.	"A."	1 "H,"
ames Harrison	Newburgh, N. Y. Newburgh, N. Y. Washington, D. C.	Woojen Mill	_	_
ames Taylor	Newburgh, N. V	Weeter Mill	1	12
Record Room.	Washington D. C.	Woolen Mili	1	12
	Chlengo, III	Government Printing	125	i
Inidwin Locomotive Works.	Chienge, Ill Philadelphia, Pa Blue Mountain Lake, N. V.	Printing		120
C. Durant	Rive Mountain I also M V	Loeomotives	75	1
		Summer Hotel	125	1
Inrihali Pleid & Co.	Chlongo, Ill. 36th street and Madison avenue, N. Y. Fort Washington, N. Y.	Hat Manufacturers	120	
	omago, m	Dry Goods	60	ı
Hood Wright	Soun street and Madison avenue, N. Y	Residence	250	50
ationni Tube Works	Fort Washington, N. Y	Residence	-3-	240
		Residence Pipes and Tubes	65	-
	Winona, Minn		70	ı
II Present	Yncht Numouns. 84 Chatham street, N. Y.	Stenm Yacht	,,,	
II. Everett.	84 Chatham street, N. V.	Hotel		120
S. Rolling Stock Co.		1100ei	130	
athan & Dreyfus. Ifred Dolge.	106th street and East River, N. V.	Car Shops		128
fred Dolge		Oil Cups and Injectors Plane Sounding Boards		125
ingue, House & Co	Glenville, Conn. Chlengo, III. Cornwall, Pa	Pano Sounding Boards		100
ilmer House	Chiara III			120
	Cincign, Ill		60	
S. Rolling Stock Co.	Cornwall, Pa	Imn Smelter	60	
regon Railway & Navigation Co.	Chicago, Ilf.	Car Shops	6.7	126
ill River Bleachery.	S. S. Colombia	Steamship	120	120
	Fall River, Mass.	Blenehem		
		Blenchery.	45	40
		Agency	. 1	250
atthiessen & Welchers.	lersey City, N. I	Sugar Refinery.	60	
ston Sugar Refinery.	East Boston Mass	Sugar Rennery		300
ttenhouse Mfg. Co	con Francisco, Cal. [erray City, N. J. East Baston, Mass. Passaic, N. J. Lawrence, Mass. Trenton, N. J. Chicago, Ill.	Sugar Refinery	- 1	125
lington Mills	syrance Mare	Silk Mill. Woolen Mill.	65	
enton Iron Co.	Transactor N. 1	Woolen Mill	130	
in V. Farwell.	Chieses 10		75	
Cormick Harvesting Mach. Co	emergo, III	Dry Goods	130	
rr & Hobson	meago, III		60	
Iliam Stronge	Bergen Point, N. J		00	120
oke Locomotive & Machine Works 1	aterson, N. J	Silk Mill	65	,
erry & Barnes		Locomotives	60	
		Pork Packers	60	
		Den Card	- 1	210
F. Beatty.	Vashington, N. J. Iberty street and Broadway, N. Y.	Dry Goods. Organs and Planos.	too	80
erican Bank Note Co	Iberty storet and Broadway N. V.	Organs and Planes.	- 1	250
gon Railway & Navigation Co	ortland Doele Occase	Bank Note Printing.	- 1	125
		Docks	iso	
gon Railway & Navigation Co	our screet and I hard avenue, N. Y	Railroad Shops		125
rrick Thread Co.		Steamship	- 1	250
x Ams	10/yoke, Mass		- 1	98
tel Vendome	72 Greenwich street, N. V	Preserves		9"
rumbo Mfg. Co	loston, Mass		63	
		Wonlen Mills	93	- 4
		Scales.	. 1	180
ed, Parions & Co A	Ibany, N. V.	Deleter	60	
mania Mills	lbiny, N. V lolyoke, Mass	Printers. Woolen Mill.		150
		ri conen pani,	50	20
	olumbia, Mo.	Steamer		126
ton Herald B	oston, Mass.	University	60	
Creek Distilling Co	incinnati, Ohio	Newspaper I	50	
I Creek Distilling Co	Siller of Discourage of the Control	Distillers Jinen Thread	60	
itney Paper Co. He is & Washbarn. Mon Rubber Shoe Co. B	fillmantic, Ct 1	Jinen Thread	60	
les & Washburn	lolyoke, Mass 1 lechanlesville, Ct.	Paper. Voolen Milis		120
ton Rubber Shoe Co.	echanicsville, Ct	Voolen Mills	- 1	
ds, Ketcham & Co N		Cubber Shoes	60	132
Y. & Norwich Line.	. Y. City	rinters.		
See & Buller	City of Woreester,"		- 1	240
Trong Salda S. C.	V. City 1 City of Worcester." Statestagun, Pa	or Chang	- 1	325
	illunter, Mian	or Shops. Agricultural and Car. Voolens.		120
berton Co	awrence, Mass Ith street and Broadway, N. V	grieuturat and Car	- 1	250
en, Son & Co 18	th street and Bearing N V	v oceans		125
ien Block	ill River, Mass	ancy Goods	امت	70
klyn Sugar Refinery tre	making press S	tores, Offices, &c	i	íz
stown Iran Co Po		uznr Refinery	21	10
Squire Re	Stistown, Pn. 1 set Cambridge, Mass. P ewark, N. J. 7	tores, Offices, &c. 12	0	Id
k Thread Co Er				
met Club	ewark, N. L	hrends		
		Such Contract Contrac	. 1	125
			41	-
tte Publishing Co Da		esidence		



HEIGHT: 6 FEET.

PULLEY: FACE, 6 INCHES, DIAMETER, 10 INCHES.

REVOLUTIONS:

10 HORSE POWER.

THE EDISON "Z" DYNAMO

60 A LIGHTS (16 CANDLE POWER), OR 120 B LIGHTS (8 CANDLE POWER).

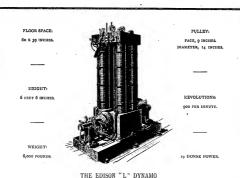
ITEMS.	60 A LIGHTS.	120 B LIGHTS.
One "Z" dynamo-electric machine complete, regulating resistance, half dozen brushes, with lamps and sockets		\$1,320 00
Fixtures vary in price from 75 cents to \$5.85 per lamp, according to style and finish. For common factory use the cost would not exceed 75 cents per lamp		90 00
The cost of wire for conductors, cut-outs, safety-catches, and other accessories for above plants will vary with distance of		
lamps from dynamo, also with number of branches and dispo- sition and grouping of the lamps. The probable average will		
he	350 00	450 00
	\$1,595 00	\$1,860 oo

These prices are exclusive of counter-shaft, belt connections, and foundations.

LIST OF "L" DYNAMOS NOW IN USE.

	LOCATION.		LAMPS.	
OWNER.	iocarios.	BUSINESS.	"A."	"R."
Pumberton Mill Co	Lawrence, Mass	Cotton Mill	250	_
Worumbo Mfg. Co	Lisbon Falls, Mc	Weelen Mill	150	1
W. M. Singerly	Phila, Record,	Newspaper	200	5
Harder Knitting Co	Hudson, N. Y	Knit Goods	160	١.
A. E. Martin	Anamosa, Iowa	Penitentiary		29
S. 11. Everett	98 Barclay St., N. Y	Hotel	250	
Academy of Music	Chicago, Ill	Theatre	150	
Lorraine Woolen Mill	Pawtucket, R. I	Woolen Mill	150	
Laurel Lake Mill	Fall River, Mass	Cotton Mill	150	
Sinter Cotton Co	Pawtucket, R. I	Cotton Mill	300	

The first "1" decome was shipped from our shops August 4th 1882.



FOR 150 A LIGHTS (16 CANDLE POWER), OR 300 B LIGHTS (8 CANDLE POWER).

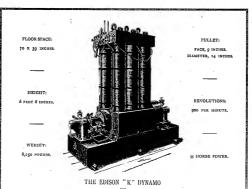
ITEMS.	150 A LIGHTS.	300 B LIGHTS.
One "L" dynamo-electric machine complete, regulating resist- ance, half dozen brushes, with lamps and sockets	\$2,000 00	\$2,300 00
Fixtures vary in price from 75 cents to \$5.85 per lamp, according to style and finish. For common factory use the cost would probably not exceed 75 cents per lamp	112 50	225 00
The cost of wire for conductors, cut-outs, safety-catches, and other accessories for above plants will vary with distance of lamps		
from dynamo, also with number of branches and disposi- tion and grouping of the lamps. The probable average will		ų.
be	525 00	900 00
	\$2,637 50	\$3,425 00

These prices are exclusive of counter-shaft, belt connections, and foundations.

LIST OF "K" DYNAMOS NOW IN USE.

OWNER.	LOCATION.		LAMPS.	
OWNER.	LOCATION	BUSINESS.	"A."	"В,"
	36th St. and Madison Ave., N. Y			50
	New Bedford, Mass			
- 1	Public Ledger			
King Philip Milis	Fall River, Mass	Cotton Mills	750	
New England Pin Co	Winsted, Conn	Slik Mill	250	
Lockwood Co	Waterville, Me	Cotton Mill	250	
Peacedale Mfg. Co	Peacedale, R. I	Cotton Mill	250	
Bourne Mill	Fall River, Mass	Cotton Mill	500	40
Consnieut Milis	Fall River, Mass	Cotton Mili	250	
Laurel Lake Mills	Fall River, Mass	Cotton Mill	250	
II. J. Rogers	Appleton, Wis	Flour Mill	300	
Sibley Mfg. Co	Augusta, Ga	Cotton Mill	500	
II. K. & F. B. Thurber & Co	New York City	Wholesale Grocers	250	80
James Gordon Bennett	"Herald," New York	Newspaper	500	
Lorraine Woolen Mills	Pawtucket, R. I	Worsted Mill	250	
Western Edison Light Co	Chleago, Ills	Agency	250	
J. W. Doane	Chicago, Ills	Residence		
Marshall Field	Chicago, Ills	Residence		
Edson Keith	Chicago, Ilis	Residence	250	i
O. R. Keith	Chicago, Illa	Residence		

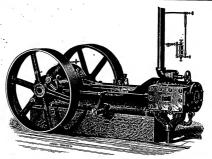
The first "K" dynamo was shipped from our shops June 3d, 1882,



250 A LIGHTS (16 CANDLE POWER), OR 500 B LIGHTS (8 CANDLE POWER).

ITEMS,	250 A LIGHTS.	500 B LIGHTS
One "K" dynamo-electric machine complete, regulating resistance, half dozen brushes, with lamps and sockets		\$3,500 00
Fixtures vary in price from 75 cents to \$5.85 per lamp, according to style and finish. For common factory use the cost would not exceed 75 cents per lamp.	187 50	375 00
The cost of wire for conductors, cut-outs, safety-catches, and other accessories for above plants will wary with distance of lamps from dynamo, also with number of branches and disposition and grouping of the lamps. From experience in plants installed we find the		
probable average will be	875 00	1,500 00
	\$4,062 50	\$5,375 00

These prices are exclusive of counter-shaft, belt connections, and foundations.



ENGINES.

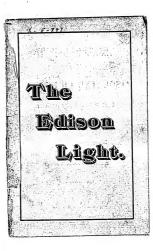
When the power already present cannot be conveniently applied to musting the dynamo machine, we can supply engines especially designed for the Edison Light. A cut of one of such engines in given above, and the various sizes, prices, δx_i , of same are given below.

	CLASS.	Λ.	B,	C.	D.	E.
다음살	CYLINDER,	6½ x 8	81/4 X 10	9½ × 12		13 X 13
M. E. P. Cutting off. 14 Stroke.	FLOOR SPACE*	39 X 84	46 x 90	56 X 100		62 X 124
~82t	PRICES.	\$650	\$850	\$1200		\$2000
	REV.	H. P.	11. P.	Н. Р.	H. P.	H. P.
20	300 350	8.04 9.4	17.18 20.05	25.74 30.	E .	52.2 60.00
30	. 350	12.09 14.1	25.77 30.07	38.61 45.	i i	78.3 91.44
40	350 300 ·	16.12 18.8	34-36 40.1	\$1.48 60,-	rine h	104.4
50	300 350	20,15	42.95 50.12	64-35 75-	termin	130.5
60	300 350	24.17 28.2	51.54 60.14	77.22 90.	this ch	150,6 182,8
70	300 350	27.2 32.9	60.14 70.17	90.09	size for this class engine has not been fally determined.	182.7
80	300 350	32.23 37.6	68.72 80.10	102.g 120.	The sk	208.8 243.8

The prices of these engines include automatic oilers for cylinder, crank-pin, cross-head, and bearings.

*These measurements include space required for projection of cylinder and notices.

[12]



THE EDISON COMPANY

FOR

ISOLATED LIGHTING,

65 FIFTH AVENUE, NEW YORK CITY.

PRESIDENT, S. B. EATON.

SECRETARY, C. GODDARD.

GENERAL MANAGER, M. F. MOORE,

NEW YORK. MICTAE, PRINTER, 29 FORE STREET.

THE EDISON

Incandescent Electric Light.

ARC AND INCANDESCENT LAMPS COMPARED.

There are two systems of electric lighting, namely, the Are and the Incandescent. The are is a light of great intensity, concentrated in one small spot, constantly changing in color, and very trying to the eyes. It is now used in streets and public buildings. The incandescent is a small, soft, steady light, of the birthy the state of the conditionary and its expectally adapted for domestic quality, and is especially adapted for domestic and industrial purposes. These two systems of lighting are radically distinct, for act which must

be borne in mind when comparing the Edison incandescent system with the are lights.



THE EDISON INCANDESCENT LAMP.

This lamp consists of a pear-shaped glass globe about 4½ inches in height, exhausted of air, into which is sealed a filament of carbonized bamboo slightly thicker than a horse-hair. This filament, becoming incandescent by the passage of the current of electricity through it, smits a beautiful, soft, white light, absolutely steady and constant, and equalling in intensity, or exceeding if desired, the illuminating power of a gas jet of the best quality.

The lamp is screwed into a socket which is permanently attached to a gas or other chandelier or bracket, and contains a key whereby the light in the lamp may be turned on or off. The lamp, once serewed into the socket, needs no further attention or eare until the earbon breaks, when the old lamp is unserewed from the socket and a new one screwed in the work of a few seconds. The lamps vary in the number of hours which they will burn, but their average life, at 16 candle power, exceeds 600 hours of actual burning. Each light is entirely independent of the others, and may be arranged and controlled singly, in pairs, or in groups of any desired number, and may be placed in any position whatever, inverted or otherwise.

ABSENCE OF HEAT.

The Editon lamp gives out but little heat (less than one-filteenth as much as gas), may be grasp-than one-filteenth as much as gas), may be grasp-than one-filteenth grasper and the state of the state

NON-EXPLOSIVE.

The lamp does not explode, and even if the glass is broken by any accident, the carbon is instantly consumed and the light at once goes out harmlessly.

PECULIAR ADAPTABILITY.

Besides being unequalled for domestic and general illumination, the light is especially adapted to the workshop. For the desk and workbench it is superior to any other artificial light, inasmuch as by inverting the lamp, its whole light may be thrown on the work in hand, in any required position whatever,

NOT INJURIOUS TO EYE-SIGHT.

The light, although bright and clear, is not injurious to the eyes, even if used close to them. Indeed it is found in practice that weak eyes, previously injured by gas, may use the light with impunity.



PIXTURE

The fixtures used for this lamp are of the same general character as those used for gas, including swing brackets, drop lights, portable lights, together with devices for inverting the light or burning it in any position, perpendicular

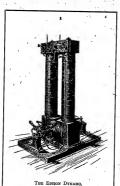


or otherwise, and also for burning it in fire damp and under water.

THE DYNAMO.

The Edison dynamo supplies the current for the lamp. It consists of a powerful electro magnet, between the poles of which an armature or inducing coil revolves. The making power may be either steam or a constant water power. The dynamo shown in the drawing below quiers since hones power, and generates a current either for 60 lights of 16 candle power each. It needs only a few minutes attention each got for dinning &c., and does not get out of order. A special engineer or electrician is not necessary. Accompanying each dynamo is a regulator by which the intensity of the lights may be regulated at will.

Besides this dynamo there are other dynamos of larger size, requiring more horse-power and generating entrents for a still larger number of lamps, while the mammoth dynamo, known as the Edison central station dynamo, generates a current sufficient for 1,200 Edison lamps of 16 candle power each, or 2,400 lamps of 8 candle power



SAFETY.

There is no danger to life, health, or person, in the current generated by any of the Edison dynamos. The electric current is so feeble that the wires at any part of the system, and even the poles of the generator itself, may be grasped by the naked hand without the slightest effect; in fact, the current is searcely perceptible to the touch.

FIRES IMPOSSIBLE.

Besides the safety from injury to the person, another pursions feature of the Edison system is its freedom from danger of fire. This is secured by means of a small automatic device invented by Mr. Edison, called the "Cut-out" (or "Safety-satch"), which may be compared to an overflow jipe in a water system, or to a safety valve on a stembolic. This safety-satch consists of a small piece of wire fusible at a low temperature, which is placed in, every circuit and even in the lamp itself. If, therefore, the wires should become heated from any cause, this safety-satch vould at once melt off and open the éricuit, thus averting all possible danger from

fire. The circuit can be again closed by taking out the safety plug and putting in a new one, the work of a moment. Fires from elec-





EDISON "CUT-OUT."

tich light arise from one of three causes; first, a crossing of wires, that is to say, wires coming in contact with each other second, the jumping of the current from one wire to the other; third, the overloading of wires with a greater amount of current than they are calculated to bear, and thereby melting them. Under the Edison system fires are impossible from any of these three sources. Not only are the wires thoroughly insultated, and also, when necessary, protected by monthlings, but the "eurout" is so introduced in the wires that fire from any of the three sources above named, or from any source whatever, is absolutely impossible. The lamp is now in use in a large number of factories and dwellings, yet no fire has ever taken place in the Edition system.

STEAMBOAT LIGHTING.

The light, besides being available for dwellings and factories, is also especially adapted to the lighting of steamboats. The cleanliines, absence of disagreeable door, wentilation, freedom from danger by fire (no matches being required), and economy, make the light better for steamboats than any other known illuminant. The lamp has also been found of the greatest value for the examination of a ship's propeller, rudder or hull, under water.

LIGHTING OF MINES.

The lamp is also used for lighting mines.
 Mr. Edison has invented devices for protecting

the lamp from breakage, even from the roughest handling, and for making the light absolutely safe from explosion or fire, even if breakage should take place in fire damp.

TRANSMISSION OF POWER.

The Edinon system supplies power as well as light: By the saw of the dynama, power may be transferred from a source of power to diental points for iss, or from one portion of a factory to another. This invention affords not factory to another. This invention affords not only the chappers tendo, in many sease, of transferring power, but also facilities for minute sub-division and complete control. Among the many uses made of the electric power are the following. The running of latkee, printing presses, seeving muchines, other small machine, electrons, and pomping vater. The errent can also be applied for telephones, call bells and burglar alarms.

LIGHTING OF CITIES.

The Edison system for lighting large cities is a modeled on the existing gas system. The current is generated at a central point, is distributed through subterranean condpetors laid under the streets, connections are made with houses by means of branch conductors, and the current thus diverted, after pessing through a meter in the gellar, which registers with perfect accuracy the quantity consumed, is then distributed over the house for use either for light or power. Houses are so wired that not only is light supplied, but by means of a device known as an electric motor power is also furnished for both industrial and domestic purposes.

ECONOMY.

The economy of the Edison incandenced light, as compared with gas, is broyed question, no matter whether the gas is obtained through the ordinary distribution system, as in cities, or is mainfactured not the premises of the economer by a portable gas machine. In estimating on this subject, the intensity of light is an important element to be considered, as the illuminating power of gas in different localities varies. The average § foot gas burner does not, even in being as companie, give n light of over 12 can-

dle power, so, in order to obtain the same amount of light as that given by the Edison standard lamp (id-camle power), a 7 foot gas burner must be used. Even then, the whole light of the gas burner cannot be utilized on a work bench or desk, because it can neither be inverted nor entirely backed up by a shade, while, on the other hand, the whole 16 candiel power of the Edison lamp is effective, inasaffisch as it may be inverted, or otherwise directed to any desired soon.

COST PER HOUR,

Assuming that the desired horse power is already present, the hourly cost of running 60 Edison lamps of 16 candle power cach is as follows:

					1.0	
9	horse	bonet (3 pound	s of coal	per hour per	
	hor	e nower	at St ne	r ton)		~6

Total running expenses per hour, 30 cents

The cost of the same number of gas jets for the same time, would be as follows:

60 gas jets each burning 7 feet of gas per hour, or a total of 420 feet at \$2 per 1000..... .\$4½ cents.

This shows a saving, by the use of the Edison light, of 54 cents per hour of actual burning, the cost of gas being nearly three times as much as the Edison light.

GENERAL ADVANTAGES.

Add to this pecuniary economy the healthfulness of the light as compared with that of gas, its freedom from older and from danger by fire, its steadiness, adaptability, completeness, and beauty, and there can be no doubt that the Edison light is unsurpassed by any other method of artificial libertine whatever.

PRICES FURNISHED.

The price for dynamos, lamps, and a complete outfit, together with estimates for wiring, will be furnished upon application to the company.

THE HIGHEST PRIZE AT PARIS.

The highest possible award obtainable at the recent Electrical Exposition at Paris was a Diploma of Honor, which was higher than a gold medal. The juries awarded Edison three Diplomas of Honor and two gold medals. The full Congress affirmed this award, and gave to Edison exclusively a Diploma of Honor for an incandescent light.

TESTIMONIALS.

The following testimonials have been received from a few of the places where the light is now in successful operation.

TESTIMONIALS.

ORANGE CO. WOOLEN MILLS,

NEWSURGE, N. Y., FEB. 11, 1882.

THE EDISON COMPANY FOR SHEATED LIGHTHYSIS SHEATED LIGHTHYSIS CASES AND A SHEATED LIGHTHYSIS HAS SHEATED LIGHTHYSIS AND A SHEATED LIGHTHY AND A SHEATED LIGHTHYSIS AND A SHEATED LIGHTHY AND A SHEA

JAMES HARRISON.

WINONA MILL COMPANY, Manufacturers of Choice Flours.

Whenous, Mines, Feb. 16th, 18th, 18t

Yours truly,

quiring friend to

WINONA MILL CO.

[NOT FILMED: PAGES 18-26. THESE TESTIMONIALS ALSO APPEAR IN THE EDISON ELECTRIC LIGHT CO. BULLETINS.]

EDISON PIONEERS

40 WEST 40TH STREET NEW YORK CITY

- The Edison Light :

PION STREET

EDISON POR STREET

H. V. Parselly.

THE EDISON SYSTEM

INCANDESCENT ELECTRIC LIGHTING,

AS APPLIED IS

MILLS, STEAMSHIPS, HOTELS, THEATRES, RESIDENCES, &c.,

THE EDISON COMPANY FOR ISOLATED LIGHTING,

65 FIFTH AVENUE, NEW YORK CITY.

1883

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THE EDISON SYSTEM OF INCANDESCENT ELECTRIC LIGHTING,

This pauphlet is issued by the Edison Company for Isolated Lighting, for the information of manufactures, hold keepen, sitemaship owners, thentrical managers and other users of artificial light. It contains a brid edescription of the Edison system of lighting mills, holds, steamships, theaters, &c., by means of isolated plants, that is to say, by apparatus which is owned, and controlled by the purchaser; also such information as to the detail of engines, dynamos, whiring, fixtures, &c., as will enable any person to estimate approximately in regard to the cost and running expenses of a plant of a given capacity.

The Edison Company for Isolated Lighting was organized in November, 1881, and, as a licensee of the Edison Electric Light Company, is entitled to do business under the Edison patents for electric lighting. Of these patents, 216 have been already issued in the United States, including the patents securing to the Edison Company the fundamental principles of incondescent lighting, and three are applications for 14st additional patents still pending in the Patent Office, which number is being constantly increased by Mr. Edisors's fundamental principles or under the complete system of Edisors's incondescent lighting now successfully included into public

Since its organization, and up to this date, this Company has installed in mills, factories, hotels, steamships, stores, residences, &c., in the United States, 199 isolated plants, aggregating upwards of 44,788 lamps. There have also been installed by other Edison companies in England, on the Continent of Europe, and in various parts of the world, upwards of 158 plants, amounting to about 29,029 lamps, thus making the total number of Edison isolated plants in all parts of the world now amount to 387, with an aggregate of 27,175 lamps.

These facts, although briefly stated, cannot fail to present to the mind of a business man the progress which has been made by this, an entirely new enterprise; but when we also state that.

- 1. We have never had a plant rejected:
- No fire or accident of any kind has ever occurred from the use of an Edison plant; and
- Many of our plants have been largely increased (see page 16), it is at once apparent that there are such substantial merits in the Edison system as merit the consideration of those who use artificial light.

DESCRIPTION.

There are two systems of electric lighting, namely, the Aro and the Incandescent. The arc is a light of great intensity, concentrated in one small spot, constantly changing in color, and very trying to the eyes. It is commonly used in illuminating streats and large open spaces. The incandescent is a soft light, of the brightness of a good gas jet of the best quality, but without flicker, and is especially adapted for domestic and industrial purposes. These two systems of lighting are radically distinct, a fact which must be borns in

mind when comparing the Edison incandescent system with the arc lights.

THE EDISON INCANDESCENT LAMP.

This lamp consists of a pear-shaped glass globe about 44 inches in length, exhausted of air, into which is sealed a filamont of carbonized bamboo slightly thicker than a horse-bair. This filament, becoming incandescent by the passage of the current of electricity through 14, emits a beautiful, soft, white light, shouldedy steady and constant, and equaling in intensity, or exceeding, if desired, the illuminating power of a gas jet of the best quality.

The lamp is scrowed into a socket which is permanently attached to a gas or other chandelie or fixture, and contains a key whereby the light in the lamp may be turned on or off. The lamp, once screwed into the socket, needs no cutther attached or care until the carbou breaks, whon the lamp is unserwed from the socked, and a new one scrowed in its place—the work of a few seconds. The lamps vary in the number of hours which they will burn, but their average life, at normal candle power, exceeds 600 hours of a catual burning. In practice, the lamps have an average life of much longer duration. The company, however, gives are written quarantee to every purchaser of a plant that the average life of the lamp shall be at least 600 hours of burning at the candle power, exceed which the lamp is rated.

Each lamp is entirely independent of the others, and may be arranged and controlled singly, in pairs, or in groups of any desired number, and may be placed in any position whatever, inverted or otherwise.

The lamps are made in various sizes, to give the light of 16, 16, 28, 50, and 100 candles respectively. All these lamps may be burned upon the same circuit, that is to say, a plant may have all its lamps of the same caudie power, or they may be varied at any time, up to the equivalent light-producing capacity of the dynamo, without changing either the wiring, fixtures or dynamo. For instance, a 10

candle lamp may be unscrewed from the socket and a 100 candle lamp put in its place, and so on, each lamp being interchangeable with any of the others throughout. The 10 candle lamp is, however, found to be the one which fills all ordinary requirements, but there are numerous cases where 10 candle lamps are found ample, especially where each workman requires a separate light immediately over his work.

The Edison lamp gives out but little heat (less than one-fifteenth as much as gas), may be grasped by the naked hand without inconvenience, is absolutely free from oder and poisonous or noxious gases, and neither heats nor vitiates the surrounding atmosphere. The most delicato of fabries are not seorched or injured by being vapped around the lamp when burning at its normal intensity.

A STATE OF THE PARTY OF THE PAR

NON-EXPLOSIVE.

The lamp does not explode, and even if the glass is broken by any accident, the carbon is instantly consumed and the light at once goes out harmlessly.

PECULIAR ADAPTABILITY.

Besides being unequalled for domestic and general illumination, the light is especially adapted to the workshop, inasmuch as by inverting the lamp, its whole light may be thrown on the work in hand, in any required position whatever. Attached to a flexible cond, the light may be placed under, over or inside of machines of every description, put under water, used in the midst of delicate or dangerous substances—and, in fact, applied as no other system of artificial lighting can possibly be.

NOT INJURIOUS TO EYESIGHT.

The light, although bright and clear, is not injurious to the eyes, even if used close to them.

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THE EDISON INCANDESCENT LAMP DETACHED FROM SOCKET.



THE EDISON INCANDESCENT LAMP SOREWED IN SOCKET.

FIXTURES.

The fixtures used for this lamp are of the same general character as those used for gas. A great variety of fixtures and attachments for the Blison light are manufactured by Messas. Bergmann & Co., 299 Avenue B, New York, whose catalogue will be found at the end of this block. Special designs to suit peculiarities of decovation and finish of rooms can be made to order if desired.

THE DYNAMO.

The Edison dynamo supplying the current for the lamps consists of a powerful electro-magnet, between the poles of which au armature or inducing coil revolves. The motive power may be either steam or water.

It is not necessary to have a special eugineer or electrician to run to his dyuamo. On completion of a plant we allow one of our mon to remain for a reasonable period of time, at our expense, to instruct the purchaser in its use. It may be run by any wordman of ordinary intelligence, and requires no more attention than could be given by any engineer without interfering with its reventlar duties.

Accompanying each dynamo is a regulator by which the intensity of the lights may be regulated at will.

SAFETY.

The current generated by the Edison dynamon never exceeds a certain intensity, or pressure, namely, the pressure extend by the current in overcoming the resistance offered by the filament of carbon in the lamp, the unit of such pressure being ferred a "voil," The highest intensity reached by the current generated by our dynamos does not exceed 110 volts, no matter what the lamp capacity of the machine may be. This may seem a paradoxical statement to those unacquainted with electrical sedence, but insamench as the use

of electric lights is becoming universal, a few words in explanation may not be out of place.

Let us compare the arc light with the Edison incandescent light. In the former, there are two pencils of carbon, the points of which are opposite each other, but separated by a space of about quarter of



THE EDISON SWITCH .
FOR TURNING GROUPS OF LIGHTS ON OR OFF.

an inch, the light being produced by the jumping of the current from one pencil to the other, thus forming what is called a "voltaio are." This jumping is effected by means of the pressure of the current, and, inasmuch as all are lamps are placed in the path of one conductor there are rent mu and the trate the

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conductor, or, as it is termed, in "sories," it follows that when there are a large number of lamps in circuit the pressure of the current must necessarily be very great to drive it through all the lamps and then back to the dynamo. The following diagram will illustuate the manner of putting lamps is sories:



It will, therefore, be seen, that in order to get to the second lamp the current must pass through the first, and so on, the electromotive force being multiplied by the number of lamps in circuit. Thus, if a current of 60 volks pressure is needed to operate one are light, it would necessitate an additional 50 volts for each additional lamp, so that with 40 are lights in circuit, a current of 2,000 volts pressure would be required.

In the Edison system, however, the lamps are placed in "multiple are," that is to say, both the outgoing and incoming wires are tapped and the lamp placed between, as shown in the following sketch:



It is obvious, therefore, from this aketch, that in our system it is not necessary for the current to pass through the first lamp in order to get to the second one, because each lamp offers to the current a path by which to cross over and re-enter the machine. It is also seen that all the lamps require only the same degree of electrical pressure.

ure to bring them up to incandescence, and, therefore, the pressure of the curront is not multiplied according to the number of lamps. All the conductors are kept charged by the dynamo, with a certain quantity of electricity, but its intensity or pressure never varies.

The offect which a current of olectricity produces when applied to various substances, differs according to the resistance offered by such substances. The resistance offered by the carbon in the Edison lamp is 140 units, or "o dura," to overcome which, for the purpose of producing an ordinary light, is required a pressure of about 110 volts. The human body has a resistance of about 50,000 ohms which could be overcome only by a current of very much higher pressure, consequently there is no danger to life, health or person, in the current generated by any of the Edison dynamos. The current is of such low pressure that the conductors at any part of the system, and even the poise of the dynamos themselves, much granged by the naked hand without the slightest effect; in fact, the current is scarcely purespitule to the touch.

FIRES IMPOSSIBLE.

Besides the safety from injury to the person, another prominent feature of the system is the freedom from danger of fire. This is secured by means of a small automatic derice invented by Mr. Edison, called the "Out-out" or "Safety-catch," which may be compared to an overlow-pipe in a water system, or a safety valve on a steam boiler. This safety-catch consists of a small piece of lead wire familie at a low temperature, placed in each branch circuit. As was stated above, the lamp offers a resistance proportioned to the preserve of the current generated. It will readily be understood, these fore, that if a conductor of less resistance be interposed across the circuit, the current would rush to this spot, because it would afford an easier passage than through the lamps. Such a low resistance would be offered if the conductors were brought tegether by my accident; and, in the absence of a safety device, the consequence would

current voltaic the cur-



THE EDISON SAPETY-CATCH.

If, therefore, the wires should become overcharged from any cause, this safety-actch would at once melt off harmlessly and open the circuit, thus preventing the flow of current and averting all possiblo danger from firs. The circuit can be again closed by taking out the safety-plug and putting in a new one—the work of a moment.

Under the Edison system, fires are impossible. Not only are the wires thoroughly insu-

lated, and also, when necessary, protected by mouldings, but the "out-out" is so introduced in the path of the conductor that fire from the source above-named, or from any source whatever, is absolutely impossible. The lamp is now in general use in factories, dwellings, theatres, steamships, &c., yet no fire has ever taken place from the Edison system.

STEAMBOAT LIGHTING.

The light, besides being available for dwellings and factories, is also especially adapted to the lighting of steamboats. The cleanli-

ness, absence of disagreeable odor, ventilation, freedom from danger by fire, and economy, make the light better for steamboats than any other known illuminant. The lamp has also been found of the greatest value for the examination of the parts of a vessel under water.

LIGHTING OF MINES.

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THE REAL PROPERTY.

The lamp is also used for lighting mines. Mr. Edison has invented devices for protecting the lamp from breakage, even from the roughest handling, and for making the light absolutely safe from explosion or fire, even if breakage should take place in the presence of fire-dams.

TRANSMISSION OF POWER.

The Edison system supplies power as well as light. By the use of the dynamo, power may be transferred from a source of power to distant points for use, or from one portion of a factory to another. This invention affords not only the cheapest method, in many cases, of transferring power, but also facilities for minute sub-division and comulete control.

Among the many uses made of the electric power are the following: the running of lathes, printing-presses, sewing machines, other small machines, elevators, and pumps.

LIGHTING OF CITIES.

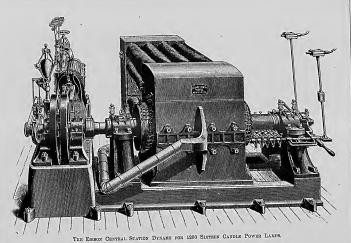
The Edison system for lighting large cities is modeled on the existing gas system. The current is generated at a central point, is distributed through conductors laid under the streets, connections are made with houses by means of branch conductors, and the current thus diverted, after passing through a meler, which registers with perfect accuracy the quantity consumed, is distributed through the house for use either for light or power. Houses are so wired om danger than any nd of the der water.

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that not only is light supplied, but, by means of an electric motor. power is also furnished for any purpose.

A cut of the standard Edison dynamo used in large central station systems is shown on the preceding page. This machine will generate current for 1,200 sixteen candle-power lamps.

ECONOMY.

The economy of the Edison incandescent light, as compared with gas, is beyond question, no matter whether the gas is obtained through the ordinary distribution system, as in cities, or is manufactured on the premises of the consumer by a portable gas machine. In estimating on the subject of economy there are many important elements to be considered, among which are the effective light obtained, the difference in cost of steam and water power, the number of hours per year during which the light is used, &c., &c. Again, in comparing our light with gas, the fact should be taken into consideration that the illuminating power of gas varies in different localities. The 5-foot gas burner does not ordinarily give a light equal to 12 candle power, so, in order to obtain the same amount of light as that given by the Edisou standard lamp (16 candle power), a 71-foot gas burner must be used. Even then the whole light of the gas burner cannot be utilized, because it can neither be inverted nor entirely backed up by a shade, while, on the other hand. the whole candle power of the Edison lamp is effective, inasmuch as it may be inverted or otherwise directed to any desired spot.

The items which enter into the cost of running a plant, in a cotton mill for instance, are as follows, viz.:

- 1. Cost of coal for generation of steam, or rent of water power.
- 2. Depreciation on machine.
- 3. Renewal of lamps.

4. Oil, waste, &c. The first item needs little comment from us, the cost of power being familiar to every manufacturer. We should say, however, that we have learned from several of those who are using large Edison plants, that they do not consume any more coal than they did before using our dynamos. This would appear to be a startling statement, but we believe from the information we have obtained, that it is nevertheless correct. This statement relates to those mills where they do not work nights, and where artificial light is only used from 300 to 600 hours per year. In this case the firemen do not put any coal on their fires for some time previous to shutting down in the evening, and it is during this time that the light is required. Consequently uo additional coal is required for the steam used to drive the dynamos.

A very important item relating to the cost of power for our machines is their efficiency in the conversion of steam into electrical energy. From tests made at the Stevens Institute of Technology by Mr. John W. Howell, it is found that the Edison dynamo converts into electrical energy 95 per cent. of the mechanical energy or indicated horse power of the engine or other motive power, and the Edison System of Lighting converts 88 per cent. of such original mechanical energy into light. (See text of Mr. Howell's report, also of report of Professors Brackett and Young, page 22.) The above results are far in excess of those attainable by any other known method of applying electricity to the production of light. The economy and efficiency thus attained make the Edison system vastly cheaper than any other now known. We give a written guarantee that our dynamos will furnish current to light at least six standard 16 candle lamps for every horse-power indicated by the steam engine driving such dynamos.

The only depreciation on the dynamo machine is the natural wear of the journals and boxes, commutator, and brushes, the total of which with ordinary care does not exceed one per cent. per annum. The lamps at their normal candle power are guaranteed to have an average life of not less than 600 hours, but their actual life has been found in practice to be much longer. In some cases, where power was abundant, it has been found by purchasers of our plants that by r power ar light req of actual for extra say, over need be

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The 1882, and A lights that one used two ment is s whole sy and is gi to be on ci gas; and uso it, if quiring 1 The last lint abou for now end of t

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that by running our lamps very slightly below their normal candle power and adding a few extra lamps to make up the total amount of light required, the average life of the lamps has exceeded 1,600 hours of actual burning. The lamps cost one dollar each. No expense for extra labor sencessary, except in the case of a very large plant, say, over 1,000 lights, and even then a part only of one man's time need be occupied.

This question of the economy of the Edison light has received so much attention from the purchasers of our plants, that we present the statements of a few of them below:

The following is copied from the Boston Cotton, Wool and Iron:

"In answer to an inquiry as to the result of the introduction of the Edison system of electric lighting in the Wmmsutta Milts, we have received the following letter:

WAMSUTTA MILLS,

NEW BERFORD, MASS., Nov. 10, 1882.

Editor Cotton, Wool and Iron: The Edison system of electric lighting was introduced into our No. 0 mill, Sept. 14, 1882, and has been in constant use over since that date, lighting the entire mili. The plant cost about \$12,000, and consists of three K dynamos, so called, each of the capacity of 250 A lights of 10 candic power each, making a total of 750 lights. The lights are so arranged that one will light four looms, giving an equal amount of light to each loom. We formerly used two four-foot can burners for the same purpose. In other parts of the mill the arrangement is such that one lamp lights about the same space as two four-foot gas burners. The whole system from the word go has moved along without a hitch of any name or nature, and is giving entire satisfaction. We like it for several reasons. It is better light than gas; It is as cheap as gas at \$1 per 1,000 feet; there is no smoke or heat from it; it is safer than gas; and, best of all, it does not vitiate the air we live in-for this reason aloue we should use it, if it cost more than gas. The dynamos are operated by one of our machinists, re quiring but a small portion of his time, say an hour and a half per day for the year. The power required is, by actual test, one-horse power for 8.0 lights of 10 candle power cacis, The lanne are grammiced to last 000 hours; and, us a well constructed will requires light but about an hour per day, or 800 hours per year, the lamps would last two years. The cost for nower, taken in connection with the power to drive our mills, is very light, at the night end of the day. We are unable to detect, any increase in the consumption of cost; but the

fires are probably burned a little lower; therefore, from this data, I should compute the

Yours, respectfully, Rawand Kilduna, Agent."

Enwand Kildunn, Agent

The following extract is from the Holyoke Transcript, October 28th, 1882:

"At a necting of the Manufacturers Mutual Insurance Co., held in Boston, last Wednesday, Mr. Chartes J. H., Woodbury, a succhanical engineer of much promiumoe, who is retained as an expert by that company, rend an exhaustive paper on electric lighting, a portion of which is of much local interest.

Mr. Timothy Neurick, or this city, authorizes him to give the faster respecting by experience with the Edines Sprient in the Mericht Tirouted Company's mill No. 5. This mill runs all sight, five nights in the words for if weeks per year, using 1ght 2,500 hours per namm. It was lighted by 60 hourses with city gas, conting 2210 net, which is amounted to \$250 per namia. Namy for Killene Il however with city gas, conting 2210 net, which cannot be \$250 per namia. Namy for Killene Il however, golds cannot provide the continue to \$250 per name. The continue that the cont

Allowing that the image average six months use, the cost of lighting is made up as

ows	I .		
	100 lamps at \$1,00	\$100	0
	Interest and depreciation	. 150	ŏ
	0 horse power at \$10,00	. 00	0
	Annual cost of Edison light	.\$408	ō
	Monthly " " "	08	0
	Manthly cost of one	. 225	0

THE EDISON SYSTEM OF INCANDESCENT ELECTRIC LIGHTING.

The results from these lomps are very satisfactory, and certainly in axeess of what would horvebeen obtained if the isams had been forced legoed their normal capetity. The Holyock Water Power Outpenpy furnishes water power very cheeply; and the result may be interesting if we hold the Edition Company to their minimum guarantee, and nice chross the deformance with four pounds of soon her bounds to force the change with four pounds of soon her bounds to force the change with four pounds of soon her bounds to force the fourth there are

	4.78-100 renewals of 65 lemps, equals 454 lamps at \$1.00\$454 00
	Interest and depreciation
	30.74 tons of coal, at \$5.75
	Attributed one of Follows Habit
	Annual cost of Edison light
	Annual cost of gas
	Monthly cost of Edison light
which	is equal to gas at 65 cents per thousand.

The nill is alterated, says Mr. Woodbury, at the best of a high bank end is only claves feet, at hickes between floors, so it is very hot in aumore, and Mr. Merrick informed met their twends have been impossible to run the mill nights during the extremely hot season hast aummer if the berja had been subjected to the host and vilitated air from the burning

Specing of Improvements Mr. Woodhury mys 'that they will certainly come, but will probably refer to attachments ruther than to the name permanent perions of the plant, will be made arteady deliver 86 or 60 per cent. of the mostly power into electricity upon the conducting wires. " " " " More than 30 per cent. of the cert lighting plants on premaring the inserted by the MIII Mixedal Imames Computeds have caused fires, but he gives no instance of one caused by an inconductor, specific made in the positively asserted that no fire or injury to person have two because the miner to the conductor of the miner than the conductor of the property of the miner than the present that the fire or injury to person have two because the miner than the miner than

The following extracts are from a letter written by Mr. F. E. Clarke, in reply to an inquiry as to the efficiency and economy of the Edison plant in the Pemberton Mill, Lawrence, Mass.;

"We pet in one 2 dynams, 63 Are 190 3 lights, by October, 180, and in fine tend the 190 lights with the light 10 pilots. With one light to show. Prove what I are in New York, Decame coarriered that the A hamp, using shalf as many, would arrow us below, conceptually in such the change, guiding 64 Ampair maning does in Annuary, 1804 With these A hamps we lighted 190 learns. The same sérenteque of the light, some of the contract of the condition of the immempher wises using no per joid, discribution of colors, think consolidate of the immempher wises using no per joid, other situation of colors, think consolidate of the immempher wises using no per joid, other distance of light common the contract of the contrac

I therefore continued for 2.1 depends, 150 lights each, giving min in 10 00 A lights. These were oil in operation arily in Normales, 1886, and here been in an accentionally sizes. After a week's use I had below ont of the two rooms ell of the party sizes. After a week's use I had below out of the two rooms ell of these are party of the end of the party of the end of the party of the fill (week readers), and one of in white a dear to sip a secsure from some brechanged of or lerge helt, etc.; hence, the fow gas join speckes of clover. The operation of the mechanical light interest the mill that far have been very satisfactory. We make colored again largely, four evener rooms are wish, and in derk days, end in fact, nearly, if not quick of the section of the secti

I have the light et my desk in the office, and its steadiness, end the obsence of heet rays, nicke it very pleasant, end I cm eble to write and read as long as I choose, without any inconvenience to my eyes, * * *

Now for comparative economy of gas and electricity. We have 365 A Holats.

Mr. John Hoskin, Agent,

We used during January, 1883, 135 lamps all day (10 hours).

Wo med during Jenuary, 1833, 201 lamps, 2 hours each day, equivalent to 181 lamps all day, 16 hours each day; es we displaced 2 gas jets with each A light, we displaced 362 gas jets.

gas jets. 302 gas jets, ten hours, 4 feet per hour, gives 14,480 feet gas. 14,480 feet gas, at \$1.00 per thousand, \$23.80 as daily cost of gas to obtain a poorer light.

Electric plant cost entire, \$0.283,00.

Power eight-tenths of one cent per II. P. per hour, for 181 lights	
28 If. P	
\$10,23 cost dully of 181 Edison lamps, 10 hours per day."	10.22

We would also call attention to the following letter from a prominent Philadelphia firm of hat manufacturers:

"PHILADELPHIA, Moy 2d, 1883.

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Edison Company for Isolated Lighting:

Dian Sm—In reply to your request, we give you our full permission to refer to us on thosubject of the Edison electric light, and our use thereof. We commenced by using

o in ail 005 A lights, as in use continually gas jets oxecpt 4 in as panio may be cogular power of the non breakage of sinft atlon of the machines inake colorul goods marriy, if net quite, in the atmospherio i indescribable. In the as it is in the full

hn absence of heat as I choose, without

vnlent in 181 inmps t, we dispiaced 382 14,480 feet gas, at

....\$ 2.78

gats --- 2.24 --- 4.66 --- 1.25

\$10.93

from a prom-

on to refer to us menocal by nating a fielding dyname, and shortly after added a second one. After a year's tells we conclude to leight our wideo to high close which exhibitments with it, and thenefore increased our plant his window to five bundered (800) issues, of statem casalles power each. The plant for this constitute of the bundered (800) issues, of statem casalles power and a mislade stem angle for the christic spice of the control of the statement of the control of the statement of the christic spice of the

Very respectfully yours, JOHN B. STETSON & CO."

The following testimonial is from another well known Philadelphia firm:

FAIRMOUNT WORSTED MILLS.

Office-166 Chestnut Street.

Риплеприи, Мау 16, 1883.

 JOHN HOSKIN, AGENT, Edison Co. for Isolated Lighting, Runm 6, Ledger Building, Philads.;

 Or, for 1,503 hours, 1,502 × 3,170; ft. −6,309,003 feet, constlag 3,300 124 × \$1.00.\$0,450 41

 Actual cost of gas used in addition to Electric Light
 1,301 56

 Actual value of gna light supplianted by Electricity
 \$5,007 85

Our expenses for the Electric Light to supplient this have been as follows, viz.;
For Iustaliation of Light, including all expenses of every kind, and
Lawrence engine for driving, \$12,000 40.

Total. \$1,131 88

FISS, BANES, ERBEN & CO.*

One other item should, we think, be added to this letter, namely, depreciation on plant. The total cases of the plant was 420,000.41, advantage and adoptionist capital avery large part of this amount, however, cavers writing, fintures, dec., which do not depreciate, leaving multi the origine part of this plant tops which a capital will find. If, repreciate, leaving multi the origine part of the plant tops which is a grant or fifth of the capital and the capital capital and the capital capital and the capital capi

We have lotters from others touching the economy of the system, but think that those above given will be sufficient to atimulate interested enquirers to make further investigation of the facts. Other letters on this point, as well as on the general officiency of the system, will be found among the testimonials in another part of this book.

While on this subject of the cost of the light and its economy, it will be found interesting to examino the following tables, showing the cost of production of the light, which have been prepared by us from data obtained by actual experience.

COST OF OPERATING AN EDISON 460-LIGHT PLANT WITH 65-HORSE POWER TAKEN FROM MAIN SHAFT OF A MILL; EACH LIGHT GIVING A SPHERICAL ILLUMINATION OF 18 CANDLES AND EQUAL TO A 74-FOOT COAL GAS BURNER.

	200 Hours pr. Year,	pr. Year,	900 Hours pr. Year,
Interest on cost, say \$8,166, at 6 per cent. Depreciation on \$50.60. on \$6,460. Cost. 12 cost per insur for each horse power. Renewals of parameter for each horse power. Of and waste. Insumnee, at .05 per cent.	76 162 944	\$998 106 102 488 406 80 16	\$300 125 162 782 000 46 16
Total annual running expense	\$1,681	\$1,565	82,044

COST OF 400 GAS BURNERS, EACH HAVING 18 CANDLES SPHERICAL IL-LUMINATING POWER, AT \$2,25 PER 1,000 FEET.

	30 Heurs	900 Heurs	900 Hours
	pr. Year,	pr. Year,	pr. Year,
469 7‡-foot burners—3 M feet per hour—‡6.75 per	hour. \$2,025	\$4,050	80,075
Cost of Edison Light as above		1,565	2,014
Saving per nanum	\$944	82,485	\$4,031

As will be seen from the foregoing tables, the comparative cost of the electric light becomes less as the number of hours of annual consumption increases, for the reason that the item of interest remains constant. Furthermore, this estimate of running expenses is based upon the assumption that the lamp will alst only 900 hours, whereas it has been found in practice that they very much exceed our guarantee, which materially diminishes the cost of producing the light. It should also be borne in mind that an Edison extense consuming 18 to 18 t

We also give, on page 19, an estimate of cost of operating Edison plants, as compared with gas and are lights, prepared by Mr. Sidney B. Paine, of our New England department.

GENERAL ADVANTAGES.

When to the pecuniary economy is added the healthfulness of the light as compared with gas, its freedom from odor and from danger by fire; its steadiness, adaptability, completeness and beauty, there can be no doubt that the Edison light is unsurpassed by any other method of artificial lighting whatever.

There is abundant evidence of the satisfaction given by the Edison system of lighting wherever it has been introduced, as will be

seen from an examination of some of the testimonials we have received, which will be found in another part of this pamphlet. Apart from these, however, the most graftlying evidence of the merits of the system is the fact that a large number of our plants have been increased by purchasers, after trial. A partial list of these plants increased by purchasers, after trial. Se siven below

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NAME,	ADDRESS,	PIRST PLANT LAMPS.	TO.
Danforth Locomotive Works		00	150
Pemberton Company		125	875
Merrick Thread Co		120	400
Wainsutta Mills		60	700
Wood, Parsons & Co		120	000
Max Ams		15	00
Sayles & Washburn	Meelmulesville, Conn.	120	800
Georgo Urban & Co	Bjiffnle, N. Y	15	60
Norton, Brother & Co	Chlengo, Ills	15	00
Sibley Manufacturing Co	Angusta, Georgin	450	000
Flas, Banes & Erben	Philadelphia, Pa	250	500
Beltimore Sun	Baltimore, Md	150	200
Worumbo Manufacturing Co	Lisbon Falls, Mc	150	650
J. B. Stetsou & Co	Phlindelphin, Pa	200	500
Eastman Dry Plate Co	Rochester, N. Y	. 15	00
Davenport Gazette Co	Davenport, Iowa	00	150
Magnelus du Bon Marché	Parls, France	500	2,500
R. Loeffel & Co	Blainville, France	60	210
Alsace, Lorrnine R. R. Co	Strasbourg, Germany.		1,200
Finlayson & Co	Tammerfors, Fluland.	800	020
Vatorico R. R. Statlon	London, England	190	210
na Kentucky Woolen Mills	Louisvillo, Ky	250	850
. Golf & Solls	Pawtucket, R. I	00	850
	Boston, Muss	150	010

In addition to the above the two following increases are especially noteworthy:

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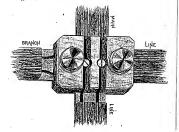
120

15 60

- (1) Messis. Seymour, Sabin & Co., Stillwater, Minn., and the Merrimac Mannfacturing Co., Lowell, Mass., each increased the dynamo capacity of their plants from 250 eight-candle lamps to an equal number of sixteen candle power lamps.
- (2) Messrs. H. K. & F. B. Thurber & Co., New York City, have twice increased their plant. The first installation was of 60 lamps. which was increased to 176, and again to 250 lamps.

WIRING BUILDINGS.

The wiring of buildings is done by experienced workmen, with none but first-class material. All wires are doubly insulated, and, in most cases, profected by woodon mouldings, as shown in the following cut:



The above cut shows the main and branch lines, the safety-catch being inserted in the latter. In the cut one part of the wooden moulding is shown as being slipped from over the wires, to illustrate the fact that they are kept a proper distance from each other in accordance with insurance regulations. In large plants where heavy conductors are required, we use for the main lines the Edison patented conductors, which are enclosed in an iron tube filled with an insulating compound. These tubular conductors are shown in the cut below:



ESTIMATES OF COST

We can at any time make accurate estimates of cost of installing a plant, requiring only a detailed plan of the building or buildings to be lighted. This plan should show the proposed location of the dynamo, the location and description of the rooms and machines to be lighted, also the total number of lamps required. An elevation. showing the height of ceilings, should accompany this diagram.

All installations are made with great care, and under the rules and regulations laid down by the New York Board of Fire Underwriters. It is only just to oursolves to state that we have in all cases taken particular pains to install our plants in strict accordance with such rules, and that in no case has a permit to use the Edison light been refused by the insurance companies, with whom our relations have been most satisfactory and agreeable. The indications tend, we believe, very generally towards the opinion that the use of our system is for all purposes attended with a far greater degree of safety than where gas or kerosene is used.

PRICE LIST.

The cost of each dyname, which includes lamps and sockets, as well as a hand regulator, is a constant, the cost of wiring, fixtures and other accessories to complete the plant depending upon the number, disposition and grouping of the lamps and upon the quality of fixtures required. A price list is given on page 60, from which it will be easy for any person to make an approximate estimate of the cost of any openedity of plant required.

. ENGINES.

Where a special engine is required to run the dynamo, we can supply one peculiarly adapted for the purpose.

This engine is built by the Armington & Sims Co., Providence, R. I., and has been modified in accordance with the suggestions of M. Edisson and the engineering department of this company. We have supplied a large number of these engines in connection with some of our plants, and they have never failed to do their work perfectly and with entire satisfaction to the custometer.

On page 63 and those following we present cuts of these engines together with tables showing the dimensions, powers, and speed of the same.

We also present, on the pages following the above, a series of diagrams giving the dimensions, &c., of foundations required for engines and dynamos, which will be of use to those contemplating the purchase of a plant. men able comp the

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COST OF THE EDISON LIGHT COMPARED WITH ARC LIGHT AND GAS.

Mr. Sidney B. Paine, connected with the New England Department of the Edison Company at Boston, has recently prepared a valuable paper on the cost of the Edison system of incandescent lighting, compared with are lights and gas in factories. His paper, printed in the Cotton, Wood and Iron, Boston, April 14th, is copied below:

lo., Providence, suggestions of

company. We connection with their work per-

f these engines s, and speed of

ove, a series of

us required for

contemplating

"We publish below, as nearly as we can ascertain, the absolute facts of the cost as between the are and incundescent systems of lighting. We believe it will be of interest to monufacturers, and it will be seen that the data given is intended to be from the standpoint of absolute accounts which have been verified by manufacturing concerns.

This outleasts is based upon the requirements of a weave shop containing 1,000 forty.

Inch looss manufacturing white shiftings. To light this recen properly will require 40 one lemps (seen lamp to twenty-four looss), or 200 factor looss and the property of the property

The estimate on the remaining exposess of the are system is issued upon a statement and by Ood. These Liferon Even Review BeNew England Cloton Manufactureral Association, in Geolober, 1982. This parasitemen is missigh of are lights (about hard bring Brand, at one-laid? Witsoin) in the Association 2018. In Manufacturer, and line kept were assumed an one-laid Witsoin, but the Association 2018. In Manufacturer with the Company of the Elize Association is also based upon seatant practice. From this experience Association 2018 and the Elizeon Company has made full guarantees, the protecting the manufacturer will be Elizeon Company has protected insoftly making these guarantees, the summandaturer will reduce the Company has protected insoftly making these guarantees, the summandaturer will reduce the Company has protected insoftly making these guarantees, the summandaturer will reduce the transfer of the Company has protected insoftly making these guarantees, the summandaturer will be allowed the contractions of the Company has been associated as the contraction of the Company has been associated as the Company has been as the Company has been

FORTY-TWO ARC LAMPS,

This plant, as installed by the Bruth Compeny, will cost \$7,000, including wiring. The power required will be 48 horse power, which at 1\frac{1}{24}, ceats per horse-power per hour (\$50 per horse-power per year), will cost 70 ceats per hour.

The "labor, carboas, and repain," at \$\frac{9}{4}\text{h}, ceats per lamp per hour, will cost \$1.21

The "labor, carboas, and repairs," of 2/4% coats per lamp per hour, will cost \$1.2 per hour.

The "depreciation," as estimated by Col. Livermore, amounts to \$2.10 per hour per lump, equal to eight coots per hour on pleast in question.

TWO HUNDRED AND FIFTY EDISON LAMPS.

This plant, as justified by the Edison Company, will cost about \$4,000, including wiring. The "power" required will not exceed 35 horse-power, which, at 1 AL cents per horse-power per hour, will cest 58 cents per hour. The "lamps and brushes," estimating that the Edison Company is called upon to make good its guerantees of an everage life of 000 hours for the lumps (renewal \$1 each) and of 200 hours for the brushes (\$10 per set), will cost 47 cents per hour. The "depreciation" of the Edison system, manning that the Edison Company is required to make good its guarantee of 1,500 hours' life for the "commutator" (renewal \$50), will ammut to three (3) cents per hour. There is no cost for "labor" enunceted with the Edison system, other than that included in the charge of 1.5h. cents per horse-pewer per hour, lussament as the dynamo can be placed in the engine room, and the engineer can pay it all the necessary attention without interfering with his legitimate work. This charge (145 cents per herse-power per hour) is extremely high. It covers all labor of engineer and fireman, fuel, water, oil, waste, and all depreciation, interest, taxes and insurance on steam plant, consisting of engine, foundations, heater, boilers, piping-stack, engine and beiler-house. These clurges, in an ordinary equipment, ought to be covered by \$40 per horse-power. While this basis may answer for the purposes of the present comparison (as both systems are brought to the same basis), it is evidently improper to adopt it in comparing either of the above systems with any other, unless such other he first brought to the same level.

Tabulating the comparative estimates given above, we have the fullowing running expenses (exclusive of interest) for lighting the above room for one heur:

T	43 Arc	250 Edison Lamps, \$4,000
Power.		\$0.58
Labor, earbons, lumps, repairs	1.21	.47
Depreciation	08	.08
Hourly expense, exclusive of interest	\$1,00	\$1.08

To light the above room with gus would require 800 4-foot burners. The plying for the above number of burners would cost, at the lowest estimate, \$1,300. These burners would consamo 2,000 feet per hour, which, at \$1.00 per thousand, will cost \$3.20 per hour.

If, instead of scempower, as agraved above, water power is most, the cost will be very materially reduced. In Levision, water power sales one of por shouse power per samula interesting the scene of power per samula lateration the plant and inlow will not exceed \$0.0 per home-power, bringing this omitted cost per year to \$0.0 per lower-power, on this bank, the power conserve is proficed as one lights in above example will cost 14 cents per hour, and to preduce the \$50 Chiles 1818, 18 2 cents we though.

The following table gives a view of the comparative heavity exposes (note-inling nitronal righting the date vers one by the three spectrus the "linguing line," or time during which light is required, in assumed to very frem 300 to 0,000 hours per your, in order to cover all registers of the probable cases, and the heavity exposes for exclosed accordingly. Appended to this hister are four obtained, showing the arring (rectioned on a percentage on the list cost -44,000 and for the probable cases, and the probable cases are found to the size of the 200 hours of the probable cases are found to the size of the 200 hours of the probable cases are sized as a four obtained, when the probable case is the size of the 200 hours fight ever the are system and gas the probable cases of the 200 hours of th

Running Time.	STEAM POWER,			WATER POWER				SAVED BY EDISON.					
	Gns nt	Are.	Edl-	Equiv	of Gas		Edi-	Equiv.	of Gus	St	cauı.	w	eter.
		Are.	50II.	Are,	Edi- son,	Aie.	ann.	Are.	Edi- son.	Are	Gas.	Are	Gas.
306	\$8.56	\$3,39	\$1.88	\$1.55	\$6.86	\$2,80	\$1.42	\$1.28	\$0.65	115	127	165	16:2
460	8.46	3.64	1.08	1.42	.78	2.45	1.22	1.14	.57	145	185	125	225
560	8.88	2.88	1,50	1.84	.74	2.24	1.16	1.66	.52	165			26:
666	8.85	2.66	1.48	1,68	.71	2.16	1.62	1.60	.48	182	28;		355
706	8.88	2.50	1.42	1.24	.68	2.00	.06	.07	-46	205		189	415
806	3.31	2.52	1.88	1.22	.67	1.68	.02	.63	.45	285	382		485
1,000	8,29	2.41	1.83	1,17	.64	1.82	.80	.86	.42	275	505		615
1,250	8.27	2.36	1,27	1.14	.62	1.74	.81	.85	.80	382	085	205	775
1,566	3.26	2.27	1.24	1.11	,61	1.68	.78	.83	.08	365	765	315	082
2,066	8.25	2.20	1,91	1.08	.66	1.01	.74	.70	.86	005	1023	43g	
8,000	8.23	2.18	1.10	1.05	.57	1.54	.70	.70	.85	- 1	1000		100:

The collected advantages, however, we all with the elected hights. The gas hotes the room and without he die. In the room in proportion (sized up the substance) from the vapupois, on out which a practical wearer will recally compenhant, as it could be a width." It discontin to cellings, thus anterloop the light. These defects are all transling with cliffer of the electric light systems in quantiles, and not only one better work to drow, and larger production to be obtain, but a manufacture range the electric large with close, and larger production to be obtain, but a manufacture range the electric larger with

to select fram an abundance of help, and thus secure the hest, while his gas-lit neighbor suffers from inferior workmanship, and a scarcity of laborers. But, passessing times advantages in common with the arc light, the Edison system goes further. Its light is absolutely steady, wallo overyone is familiar with the flickering of the gas flame or are imp. Uniike the latter, shutting off imps saves power in praportion, and should it be necessary to stop, say four out of the twenty-four icoms, it is not accessary to commune a horse-nower for twenty which continue to run, as each Edison lump may be turned off, entirely independent of the others, and one seventh of the power will be saved. Again, on "dark days" it is necessary to light the centre of the room before the sides. The are lamps named above being "in series" on one circuit, must be switched off each in turn, and then, with no saving to power, as It is impossible to shut off more than three tenths of the lamps on those circuits without throwing in an equivalent resistance citter by other lamps or resistance colls. On the other hund, the Edison lamps are arranged in several distinct elrenits, each of which runs the length of the room, and parallel to the others. By switches the cutire line may be start off at once, with a resulting economy in power. An automatic regulator is provided which, as lamps are turned off in the rooms, inserts resistnace in the magnet circuit (not in the direct circuit, or the circuit in which the lamps are placed with the are lights), thus allowing less current to pass around the magnets. These magnets, therefore, become weaker, and less power is required to turn the armature. The Edison is the only electric light company using an automatic regulator, whereby an abso-Intely stendy and nulform light is maintained, irrespective of both the load and speed of the armstore, within reasonable limits; that is, it cannot produce light when the dynamo is at rest, nor entirely adjust should that speed be doubled. The former case is not expecied, and the latter never occurs in practice. The tires, stated in the daily papers as being produced trom the "cicetric light," have been due to the are light; no insurance company has ever been estied upon to pay a cent on account of damage by the Edison aystem. The reason is obvious. Edison uses an automatic safety device, which is absolute in its action. It acts on the same idea as the automatic sprinkler, and is even more sure. Only the one, or at most three lights, on the "tap" would be extinguished in case of an accident, as each top is protected by its own safety-cotein. The use of such an arrangement on an are light circuit is theoretically possible, but it is utterly impracticable. The are lights are, so to speak, strung along one wire, the current for the second pussing through the first; any break in this circuit will instantly extinguish every one of the lights on the machine-u most serious objectian, es a panio would inevitably came among the operatives. Again, break-downs on the looms usually occur below the lattic, and as the dense shadows east by the are lump render repairs by its aid out of the question, oil lumps must be used to the great discomfort and disadvantage of the mechanics. Edison has a lanteru which may be attached by means of a flexible cord to the socket over the loom orether machine. This iantern may thus be carried about within a radius of the length of the flexible cord. The lantern may be carried to any part of the room, and there made available about any macities by detaching it from one socket and attaching it to another.

The current produced by the Editon dynames is perfectly harmless, it being impossible to produce lajury to the person by its passage through the body. An ordinarily close reoder of the dully pepers cannot fall to have been struck with the number of needdests resulting from the nee of the are light or gas.

Thus, for elempness in first cost, economy in running expenses, and general efficiency and desimbility, es well as sofety to the person and property, the advantage seems to be entirely on the side of the Edison system, as compared with the are system or get. Its superiority to citther of the other systems is not confined to the illumination of weave shops, an equal advantage will be found in either the spinning, speeling, carding, or other departments of a cotton, weoleten or weested mill.

In machine shops, or other piaces where special light is required, the Edison system stands without a rival.

concessing these ier. Its light is a flume or are and should it be to consume a be turned off, ed. Again, on The are lamps turn, and then, his of the lamps other lamps or severni distinct lie others. By in power. An s, inserts resistthe lamps are agnets. These annature. The sereby an absoand speed of en the dyname case is not ex-; no insurance by the Edison ich is ebsolute ett more sure. In ease of an n arrangément ble. The are asing through lights on the the operatives. ust be used to rn which mey achine. This e cord. The

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ECONOMY OF THE EDISON DYNAMO-MACHINE.

Report of companison retwers the Phony and Erison Dynamoneters, and upon the efficiency of the Edison Dynamo-selectric Machine, by Professors C. F. Brackett and O. A. Young, of the College of New Jersey, Phinoeton, N. J. Experiments same April 3, 1880.

FIRST COMPARISON BETWEEN THE DYNAMOMETERS.

The lever arm of the Preny was held down by the action of a spring balance applied at division 12, corresponding to a virtual circumference of 12 feet. The weight of the balance was 5.11 pounds, which is to be added to all its readings. The balance was read by Mr. Upton. After the experiment, the Bilizen dynamometer, transmitting no work, as read by Prof. Brackett, indicated (the mean of five readings, ranging from 900 to 990 904.9 pounds. During the experiment the readings were made by Prof. Brackett and recorded by Prof. Young.

Duration of test, 10 minutes. Number of revolutious of Prony shaft, determined by counter,

5,664. Number of revolutions of main shaft, 1,880.

Mean indication of Edison dynamometer, deduced from Prof. Brackett's ten readings, varying from 920 pounds at beginning to 935 at end of experiment, 925.7 pounds.

From this, taking the mean reading of the zero, 994.2 pounds, we have $\frac{994.2-925.7}{}$ = 34.25 pounds.

Mean tension on Prony arm, 9.011 pounds, varying gradually

from 10.91 pounds at beginning to 7.66 pounds at end of experiment, including weight of scale.

Work registered by Prony, 9.011 (lb.) \times 13 (ft.) \times 5.664 (rev.) - 612,460 ft. lb.

The diameter of main pulley is 38 inches.

The angle between belts of Edison dynamometer is taken at 44°.

Assume $K = \left(\pi \times \sec. 39^{\circ} \times \frac{88}{19}\right) = 10.7397$. Then the Edison dynamometer registered K (ft.) \times 1380 (rev.) \times 34.35 (b.) = 690,880 ft. lb. That is, the Frony recorded 88.6 per cent. of the work carried by the Edison dynamometer.

The comparison does not seem to us satisfactory on account of the considerable change in the conditions during the experiment.

SECOND COMPARISON.

Constants and observers as before. Duration of test, 4 minutes. Number revolutions of Prony, 2,281. Number revolutions of main shaft, 752.

Mean tension on arm of Prony, 11.35 lb., varying from 11.60 to 10.07 in seven readings.

Initial reading of Edison dynamometer (mean of five), 994.2.

Mea (Mes · Wo: 310,680 : Wo

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ECONOMY OF THE EDISON DYNAMO-MACHINE.

DYNAMO-ELECTRIC

N. J.

nd of experiment.

ft.) × 5.664 (rev.)

er is taken at 44° he Edison dynab.) - 690,880 ft.

work carried by n account of the eriment.

g from 11.60 to five), 994.2.

Final reading of Edison dynamometer (mean of five), 994.2. Mean during comparison, 911.57.

(Mean of seven readings, varying from 910 to 915 lb.) Work according to Prony, 11.35 (lb.) × 12 (ft.) × 2,281 (rev.) -

Work according to Edison instrument, K (ft.) × 752 ×

994.2-911.57) - 883,800 ft. lb.

In this comparison the Prony registers 93.2 per cent. of work indicated by the Edison dynamometer.

We regard this test as fairly reliable, the conditions having been very constant, and the outstanding difference of 6.8 per cent. being reasonably accounted for by slip of belts and friction of journals between the two dynamometers.

TESTS OF THE EFFICIENCY OF THE DYNAMO-ELECTRIC MACHINE.

During both these tests the thermometer of the calorimeter and the Edison dynamometer were read as often as every minute, and great pains were taken to keep the water thoroughly stirred. The calorimeter was a galvanized iron vessel, 16.49 inches in diameter and 244 deep.

The wire coil was wound upon a light wooden frame, so constructed as to serve as a very efficient stirrer.

The thermometer was an excellent instrument, by James Green, graduated to fifths of a Fahrenheit degree, each degree being about three-sixteenths of au inch in length.

Prof. Brackett read the dynamometer.

Prof. Young read the thermometer and made the records. Mr. Upton and others, the speed of the main shaft and the indications of the high resistance galvanometer in the laboratory.

CONSTANTS.

Weight of calorimeter (empty)	22.63 lb. 2.53 lb.
Weight of wooden frame	5.71 lb.
Heat capacity of frame (s. taken at 0.80)	1.71 water lb

Weight of wire coil (541 turns, each turn weighing

5.84 grammes). Heat capacity of wire (s., 0.10)	0.07 water lb
Resistance of wire on revolving armature	0,140 ohm. 1,470 ohms.

RIDGE TEST.

Total weight of calorimeter with contained water and

Hence from preceding data the heat capacity of whole, 172.77 water lb. Temperature of air..... 72.2° Temperature of water at beginning 63.8° Temperature of water at end 80.5° Dynamometer at end (free)......995.

Mean 172

Mean reading of dynamometer during experiment...771.75 lb. (Varying from 760 to 781, 16 readings).

E. M. F. of current maintaining field was 61 divs. of galvanometer, on which 158 d. corresponded to 16 Daniell cells, i. e., E. M. F. $=\frac{61}{168} \times 16 \times 1.079$ volts.

Energy expended on driving armature, as indicated by dynamometer — K (ft.) \times 172 (rev.) \times 13.833\(\frac{1}{2}\) (min.) \times (\frac{994.6 - 771.75}{2} -2,844,600 foot pounds.

Energy expended on field of force, $\frac{6}{5} \times \frac{45.25 \text{ (ft. lb.)}}{1.47 \text{ (ohms.)}} \times 13.883 \text{(m.)}$

 $\times \left(\frac{\beta 1}{168} \times 16 \times 1.079\right)^2 = 19,634$ foot pounds. Hence, total energy expended, 2,864,234 foot pounds.

Energy Realized.

 a. In calorimeter = 772 × 172.77 × 16.7°	
c. In armature $\frac{14}{172}$ of calorimeter	181,302 ft. lb.
Hence,	
Total energy realized	416,147
Total available $(a + b)$	234,845
Hence,	
Total efficiency	84.5 per cent.
Total available	78.2 per cent.

Remarks.

During this test the driving power was about 64 horse power; the electromotive force of the field current, 6.27 volts, giving a current through the magnet wires of about 41 webers; and the current developed by the machine was about 45.8 webers through a total resistance of 1.866 ohms.

SECOND TEST.

Total weight calormeter and contents	200.00 10,
Hence by preceding data, heat capacity	175.27 wat
Temperature of air	" to 71.8"
Initial temperature of water	63.20
Terminal temperature of water	79.9°
Gain	16.7°
Duration of experiment	9 minute
Speed of main shaft, beginning	
Speed of main shaft, middle	173 per m.
Speed of main shaft, end	177 per m.
Mean	175.33
Dynamometer reading before experiment	
Dynamometer reading after experiment	995
Mean dynamometer zero	000

ometer) $-\frac{145}{168} \times 16 \times 1.079 - \dots 14.901$ volts.
E. M. F. of dynamo current $-\frac{240}{51} \times 20 \times 1.079 =101.55$ volts.
E. M. F. of terminals of dynamo; current broken,
$\frac{290}{51} \times 20 \times 1.079$ —
Energy Expended.
a. In driving armature according to dynamo-
meter, K × 1754 (rev.) × 9.0 (m.) × $\frac{990-656}{2}$ —2,827,550 ft. lb.
b. In maintenance of field of force, $\frac{6}{5} \times 44.25$ (ft.
lb.) \times 9 (m.) $\times \frac{(14.901)^2}{1.47}$ =
Total energy expended
Energy Realized.

Mean reading of dynamometer during the experiment · The

long wi time. Dui power, a Eve trifling.

1

a. In calorimeter, 772 × 175.27 × 16.7°2,259,700 ft. lb.
 In leading wires store of above
c. In armature $\frac{0.14}{1.72}$ of a
Total energy realized $(a + b + c)$
Available (outside of machine) $(a + b) \dots 2,267,232$ ft. lb. Hence,
Total efficiency

Remarks.

As a check we may compute the total efficiency from the galvanometer reading and the resistance: Energy developed, 44.25 (ft. lb.) × 9 (m.) × 101.55 (volts) × 1,806 (ohms)-2,200,500 ft. lb.

25

......656 galvan-...... 14,901 volts. 079 --..101.55 volts.

eriment

broken,

ynamo--- ...2,827,550 ft. lb.

4.25 (ft.

...... 72,180 ft. lb.

.....2,259,700 ft. lb. 7,532 ft. lb. 183,980 ft. lb.

.....2,451,162 ft. lb.2,207,232 ft. lb.84.5 per cent.78.2 per cent.

oncy from the galvanveloped, 44.25 (ft. lb.) 0,500 ft. lb. The discrepancy is fairly explained by the defective insulation of long wires leading to the galvanometer, as it was raining at the time.

During the experiment the driving power was about 0½ horse power, and the current was 57.4 webers (according to galvanometer, 54.4).

Even with this current the spark at the commutator was vory trifling.

SUMMARY.

According to first test. \$4.5 p. c. ... 4xallable Emelency. 78.9 p. c. ... 78.2 p. c. ... 78.2 p. c.

The Prony dynamometer is connected to the Edison dynamometer by a belt from the same counterhaft, which is also balled to the electric generators. If we should assume the correctness of the Prony, and that the lose in the transmitting power between the Edison dynamometer and the arbor of the armature was only the same as between the two dynamomotes, the above numbers would have to be increased in the ratio of 100 to 93.2 (see above), and we should have:

Total efficiency 90.7 Available efficiency 83.9

C. F. BRACKETT, C. A. YOUNG.

PRINCETON, N. J., April 10, 1880.

THE ECONOMY OF THE EDISON DYNAMO-MACHINE.

Extracts from a pairir written by Mr. John W. Howell, of the Stevens Institute of Technology, reporting his tests on the Edison Dynamo Electric-Machine, Lamps and Conductors. Published in Van Nostrand's

ENGINEERING MAGAZINE, JANUARY, 1882.

In writing this thesis I have endeavored to determine as nearly as I was able the cost of electric lighting by ineandescence. Owing to the interest attached to the subject, and the lack of data upon which calculations can be based. I have endeavored to consider the subject in all its details, and have taken overy precaution that suggested itself to guard against error.

The data given are sufficient to calculate the number of lamps to be obtained from each indicated horse-power in a steam engine; beyond this I have not attempted to go, as my experience is insufficient to enable me to make any further determinations.

EFFICIENCY OF THE GENERATOR.

The generator tested was one of the latest pattern devised by

In my experiments the field was excited by a current shunted from the main circuit, the relative resistances of the mains and magnet coils determining the amount of energy expended on the magnets, and consequently the intensity of the magnetization and the electromotive force of the generator. wh

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APPARATUS FOR MEASUREMENT OF THE MECHANICAL ENERGY TRANSMITTED TO THE GENERATOR.

In measuring the energy transmitted to the generator, the dynamometer built by the class of 75 was used. This was carefully standardized by supporting the pendulum in a horizontal position at a point 2 feet from the axis of the shaft, and weighing the pressure of the support upon a platform seel; the weight of the pendulum and support was 183.25; the weight of the support was 181.1; the weight of the pendulum was 11,1 like.

This gives us the force acting at the circumference of a pulley of 1 foot radius by multiplying 171.2 by the sine of the angle of defection. This is a measure of the force transmitted through the gear at the top of the pendulum, and includes, beside the force required to turn the armature in the field of force, the force one construction of the defendence of the department of the dynamometer bearing, and also the

a Prony brake was applied to the pulley of the armature, close beside the belt, while the generator was running. Removing the brushes, to be sure no current was generated, we tightened the brake until the pendulum showed the same deflection that it did during the test; we thus made a direct substitution of the Prony brake for the retarding action of the lines of magnetic force upon the armature when the circuit was closed, and the force exerted by the arm of the brake, TESTS ON THE upon a platform scale reduced to the radius of the pulley, will be the force required to turn the armature in the field of force. Instead of measuring the pressure exerted by one arm of the brake upon a scale, we measured the lifting effort exerted by the other end upon a weight resting upon the seale. We placed a light counterweight upon the other end of the brake, to make the zero reading more and the electrodefinite, and in getting the zero we raised the counterweighted end, and let it down gently, rapping the center of the brake to prevent

> sticking. Several readings fixed the zero between 351 and 35. Running at about the same speed as in tho test, and tightening the brake until we got a deflection of 42°, we made several readings on the scale, which varied from 19 to 201. Using the highest zero reading and the lowest running reading, we get a force of 164 lbs. acting at a distance of 2 feet from the center of the shaft; this reduced to the radius of the armature pulley gives $161 \times \frac{24}{5}$ 79.2 for the force acting at the eircumference of the armature palley. If no friction had intervened this force would have been

friction of the armature shaft in its bearings. In order to determine

what part of the transmitted energy was lost in overcoming friction,

171.2×(sine 42°-66.913)_91.044 lbs., 125

showing a loss of 91.644-79.2-12.444 lbs., or 134 per cent. of the power transmitted.

This loss of 134 per cent. is caused by the friction of the dynamometer and the friction of the armature bearings. To get the force actually applied at the circumference of the pulley on the armature shaft, we must determine the friction of the dynamometer bearing alone. To do this we made a wooden brake of the same diameter as the driving pulley on the dynamometer that could run on a 10-inch pulley on the dynamometer shaft, we then clamped the Prony brake upon the dynamo pulley, and also clamped the belt on the dynamo pulley and passed it over the wooden brake. Running under these conditions and tightening the wooden brake on the 10-inch pulley until the pendulum showed a deflection of 42°, we measured the force acting at the circumference of the dynamo pulley and also at the eireumference of the dynamometer pulley by the lifting effort of the Prony brake upon the weight on the seale. The object of this arrangement of brakes was to get the friction under the same conditions as those under which we ran the test. To get the zero reading in this case we clamped the Prony on the dyname pulley, and loosened the wooden brake and counterweighted the other arm of the Prony brake, until the armature turned in its bearings; then letting it come to rest and rapping the bearings of the dynamo and dynamometer, we determined the zero reading to be 33 lbs. Several readings fixed the readings for 42° at 16 lbs., therefore the force acting at the circumference of the dynamo pulley was $(33-16) \times \frac{24}{5}$ -81.6, showing a loss of 91.644-81.6-10.044 lbs., or 10.9 per cent. of the total energy transmitted.

APPARATUS FOR THE MEASUREMENT OF ELECTRICAL ENERGY,

The resistance over which the generator worked consisted of three strands of iron wire in multiple arc, each of which was .104" in diameter. These were stretched from one gallery of the shop to the other in the open air.

In measuring the resistance of the different parts of the circuit wires were led from the binding posts of the generator to the Wheatstone bridge, then by breaking the connection with the armature and

ENERGY TRANS-

generator, the is was earefully ontal position at ing the pressure f the pendulum t was 12.1; the

ence of a nulley the angle of deed through the ide the force reforce necessary ng, and also the maguet coils, we could measure the resistance of the line, or by breaking the counselicons with the line and magnets we could measure the resistance of the armatuse and leaders, or by breaking the connections with the armatuse and the line we could measure the resistance of the magnet coils.

The electrical energy developed in the circuit was determined by tree methods:

- 1st. By a voltameter, or a copper-depositing cell.
- 2d. By a calorimeter.
- 3d. By measuring the electro-motive force and resistance.

Person Mersion

The voltameter consisted of a glass jar large enough to hold six plates of copper, $7'' \times 8''$.

These were placed 4" apart, and held in place by a light wooden frame. They were connected laterably to the pecitive and negative wires from the generator. This method of arranging the plates brings both sides into action, gives a large area of plate, and makes the resistance of the cell very low and the consequent heating very little. By means of mercury connections the voltameter could be thrown into or out of circuit instantly without breaking the current, and the leaders were so proportioned that throwing it in and out did not alter the resistance of the circuit.

In calculating the current from the weight of copper carried from one sot of pales to the other, the weight gathen by the negative from one sot of pales to the other, the weight gathen by the negative plates was considered as the weight carried over, and the constant saying the saying the pales was considered as the weight carried over, and the constant in milligrams carried over in one second by a current of one Weber. Before making the test, the current was passed through the volta-moder for some time, in a direction opposite to that in which it was not present during the test, to fances what the coopper carried over during

the test was copper that had been deposited before, otherwise energy may be lost in separating the copper from the positive plate.

SECOND METHOD.

In determining the electrical energy by the second method, a calorimeter was used which consisted of a cylindrical vessel of galvanized iron encased in a wooden jacket, and so supported as to leave an air space of about \(\frac{1}{2}\) an inch on all sides between the calorimeter and the jacket. This prevented any great conduction of heat from the calorimeter to external objects; still some heat must be wasted in heating the calorimeter and the surface it rests upon.

To determine the amount of heat thus wasted 55 lbs, of water were put in the calorimeter, and its temperature carefully determined it was 19.85°C. A large pail of water was then heated to 54.3°C, and 18% lbs. were poured into the calorimoter. This made the weight of water in the calorimeter about the same as was used in the test, and the same part of the calorimeter was heated in each case, the final temperature of the water being 28.50°C, the range of temperature used in the test was included in this range. The heat contained in the water poured into the calorimeter may be represented by 18.75 \times 26.2 - 401.25. Of this $55 \times 8.65 - 475.75$ went to raise the temperature of the water in the calorimeter, and the remainder 155 must have been imparted to the calorimeter. As the range of temperature in the calorimeter was 8.65°, 1.78 of these units were required to raise the temperature 1°, or the same amount of heat was used in heating the calorimeter as would be required to raise 1.78 lbs. of water through the same range of temperature; therefore the proper correction may be applied by adding 1.78 lbs. to the weight of water in the calorimeter.

To measure the heating effect of the current, a coil of copper wire was put into the calorimeter, the resistance of which was ex-

test of this k of the wire to the wire. T sistance of th from one pa be calculated used, the res The resistan ceptibly from evidence of was discerni test, a Fahre of degrees, b gree could ea of the water ter of the cal 1套" in diame ter and couts a valve oper the top of th surface when coldest. Th some ink dro

actly .11 Oh

In deter electro-motiv generator, by As a standar four of whice each other herwise energy plate.

cond method, a al vessel of galorted as to leave the calorimeter on of heat from must be wasted on. 55 lbs. of water

ully determined d to 54.3°C, and le the weight of iu the test, and h case, the final of temperature at contained in nted by 18.75× he temperature 155 must have temperature in quired to raise used in heating water through orrection may in the calori-

coil of copper which was exactly .14 Ohm. at 74°F. The chief source of error in a calorimeter test of this kind is the tendency of the current to pass from one part of the wire to another through the water, instead of passing through the wire. This in itself is not a source of error if we measure the resistance of the coil in the water, but in so passing, it may carry metal from one part of the wire to another, and the energy so used cannot be calculated, and is lost; to obviate this difficulty distilled water was used, the resistance of which is much higher than ordinary water. The resistance of the coil measured in the water did not differ perceptibly from its resistance in the air, and at the close of the test no evidence of copper having been carried from one part to the other was discernible. To determine the range of temperature during the test, a Fahrenheit thermometer was used that was graduated to fifths of degrees, but the graduation was so plain that twentieths of a degree could easily be read. In order to be certain that the temperature of the water was uniform throughout a pump was placed in the center of the calorimeter, which consisted simply of a copper tube about 13" in diameter, its bottom was 4" above the bottom of the calorimeter and contained a valve opening downward; the piston also carried a valve opening downward. The water in the calorimeter covered the top of the tube, and by this means the water was taken from the surface when it is warmest, and carried to the botiom, where it is coldest. The circulation thus obtained was very perfect, as shown by some ink drops put in the pump barrel.

THIRD METHOD.

In determining the electrical energy by the third method, the electro-motive force was measured between the binding posts of the generator, by means of a Thomas high-resistance galvanometer. As a standard of electro-motive force, Latimer Clark cells were used, four of which were made up new for the purpose. These agreed with each other very closely, and in using them they were connected

in series, thus getting their combined effect, and averaging their errors.

In using them they were allowed to charge a condenser, and the condenser was then discharged through the galvanometer.

The deflection produced is an accurate measure of the current flowing through the galvanometer and consequently of the charge held by the condenser, which depends upon the electro-motive force of the terminals connected with the condenser. To connect the condenser alternately with the cells and the galvanometer, a simple switch was used by which the change could be made instantly. In making the test part of the condenser of 2-3\(\frac{1}{2}\) microfarmid capacity wire used and four standard cells in serios. The damping magnot of the galvanometer was then adjusted until the discharge of the condenser produced a deflection of 301 divisions, as the electro-motive force of the cell is 1,469 volta and four in series were used, the de-

flection corresponding to one volt was $\frac{201}{1.456 \times 4}$ =50. The instrument

being standardized in this way, the liability to error was very small; in use, however, γ_{σ} of the current was shunted from the galvanometer, only allowing γ_{σ} to pass through, thus getting five deflections to a volt.

The ends of all wires dipping into mercury were amalgamated with mercurous nitrate, which made the connections very perfect.

In measuring the vesistances of the armature and of the armature and leaders, the Wheatsdoors bridge was used, and Thomson's reflecting gulvanometer in place of the small gulvanometer usually employed. The resistance of the armature mains and leaders was between .17 and .43 0 hm. When the bridge indicated .17 the gulvanometer showed a deflection of 9.0.8 divisions; when it indicated .18 the gulvanometer showed an opposite deflection of 4.6. From this we get the resistance of the armature mains and leaders, 1,7366 0 hm.

The main alone measured .14400, leaving for the resistance of the armature and leaders to the binding parts .020 Ohm. Leading wires being elamped on the commutator the resistance measured in several positions was .16207. These leaders measured .14604, leaving for the resistance of the armature alone .016 Ohm.

The resistance of the field magnet coils was 37 Ohms.

TEST BY VOLTAMETER.

Before making the test the generator was run for some time to allow the circuit to heat up, and the resistance of the line measured from time to time until it was found to remain constant. The voltameter was then introduced into the circuit and allowed to romain fifteen minutes.

During this time the speed of the dynamometer was determined for ten minutes, and the average speed computed.

The deflection of the pendulum was observed every three minutes and the average taken, although the variation was only one degree. At the end of the test the circuit was broken and the resistance again

measured, and it was found not to have changed perceptibly.

The plates were then removed, washed in water, then in alcohol, and dried in a gentlo heat. They were then weighed carefully.

Data OPTAINED FROM THE TEST.

Time of test — 15 minutes.

Weight gained per second — 27,183 m. g.
Average speed of dynamometer — 400,6 rev. por min.

Average deflection of pendulum — 42° 20′.

Resistance of from wire — .70 Ohm,

Resistance of two wires and magnet colls in multiple are — .744

Weight of copper gained by negative plates == 24,465 m. g.

Total resistance of circuit—.744+.029—.773 Ohm. Internal resistance of armature—.016 Ohm. RESULTS OBTAINED FROM DATA.

Value of current in webers— $\frac{27.183}{.32450}$ =83.753. Electrical energy (83.753)* \times .773 \times 44.24 \times 239880.726 ft. lbs. per

Energy indicated by dynamometer 171.2× (sin. 42°--.67344)× 4505×6.2832 --290125.54 ft. lbs. per minute.

Friction of dynamometer and generator 290125.54×.135—39166.-9479 ft. lbs. per minute.

Energy used in turning armature in field of force 390125.54×855

-250958.59 ft. lbs. per minute.

Friction of dynamometer alone-290125.5×.109-31623.68 ft. lbs.

per minute.

Energy actually applied to armstnre pulley 290125.54×.891—

258501.06 ft. lbs. per min.

Of the total electrical energy 239880. $\frac{016}{773}$ 4965.189 appeared in

the armature, .744
.773×49.68×239880.726—4647.39 in the magnet coils, and 230268.176 ft. lbs. per minute in the external circuit.

The officiency of the generator is the ratio of the energy required to turn the armature in the magnetic field, to the total electrical energy developed—399880.726 —3508.55.5—355.

The commercial efficiency is the ratio of the energy required to drive the machine (including friction) to the electrical energy which appears in the external circuit—230208.169

3608.

TEST BY MEANS OF THE CALORIMETER.

As in the voltametric test the generator was first run until the eircuit was thoroughly heated, and the same care was taken to determine the speed and deflection of the dynamometer. When the calorimete sistance w much. A ured carefi became co

mueli. At ured carefi became co

> Rango Specifi Avera Avera Time o Resista This a

Water

Conne

Resista

Energy 35022.897 f Total e minute.

Energy -291201.40 Energy .865-25188 calorimeter was thrown into the circuit an approximately equal resistance was thrown out so as not to change the total resistance too much. At the end of the test the resistance of the circuit was measured carefully as soon as the circuit was broken and before the wires became cooled.

ft. lbs. per

-.67344)×

35-39166,-

 125.54×855

3.68 ft, lbs.

.54×.801-

ppeared in

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When the

DATA OBTAINED FROM THIS TEST.

Water in calorimeter — 77 lbs.
Connection for wate heat — 1.78 lbs.
Rango of temperature — 79° — 60.8°—0.9°F.
Specific heat for this rango — 1.001.6.
Average specific of dynamometer — 90¢ rev. per min.
Average deflection of pendulum — 43° 24′ (sin — 68700).
Timo of tests — 10 minutes.
Resistance of ion wires and calorimeter coil — ,68 Ohm.
This and magnet coil in multiple are — .067 Ohm.
Total resistance of circuit. 60°H-029°—,600°.
Resistance of adorimeter coil — 1.0 hm.

RESULTS OBTAINED FROM THESE DATA.

Energy developed in calorimeter— 78118×1.0015×0.2×772 10

35022.807 ft. lbs. per minute.

Total electrical energy 35092.807×0.00—243750.30 ft. bs. per

minute.

Energy indicated by dynamometer—171.2×.98799×894×6.2832

-201201.40 ft. lbs. per min.

Energy used in turning armature in field of force 201201.46×

Energy used in turning armature in field of force 201201.46× .805—257880.265 ft. lbs. per min. Energy actually applied to armature pulley 201201.40×.801-259400.5 ft. lbs, per min.

Of the electrical energy $943750.30 \times \frac{.016}{.606} = 6993.09$ appeared in the armature $243750.30 \times \frac{.667}{.606 \times 64.11} = 4215.89$ in the magnet colle; and 233939.81 ft. lbs. per minuto appeared outside.

Efficiency—243759.363—967.

Commercial officiency—233939.81 -.. 90

Test by Measurement of the Electro-Motive Force and Resistance,

In this test the electro-motive force was measured between the binding posts of the generator, and the external resistance was measured between the same points.

The deflection and speed of the dynamometer were measured at the same time, the electro-motive force was observed and the resistance was measured just before and after these observations and was the same in both cases.

DATA OBTAINED FROM THIS TEST,

Electro-motive forco—58 volts.
Resistance of circuit (extegnal) .04 Ohm.
Resistance between binding posts .629.
Average speed of dynamometer, 355 vov. per min.
Average deflection, 42° (nat. sine—.00018).
Total resistance of circuit, .055.

RESULTS OBTAINED FROM THESE DATA.

Energy developed in external circuit $\frac{(53^\circ)}{620} \times 44.24 - 197567.43$ ft.

Total electrical energy 197567, $43 \times \frac{.658}{.629} = 200673,0295$ ft. lhs. per min.

Energy in armature $206673.029 \times \frac{.016}{.658} = 5025.5$.

Energy in magnet coils $\frac{(53^\circ)}{37} \times 44.24 = 3340.667$ ft. lbs. per min.

above tests, however, further improvements have been made which show oven a still higher efficiency.

Energy in external circuit 198300.88 ft. lbs. per min.

Energy indicated by dynamometer 171.2×.60913×355×62332---

Energy used in turning armature in field of force 255519.04×
.865-221023.97 ft. lbs. per min.
Energy actually applied to armature pulley 255519.04×.891-

927667.47 ft. lhs. per min.

Efficiency - 206673,0295 - ... 935.

 $Commercial\ efficiency = \frac{198300.88}{227607.47} -.87.$

Average efficiency, .951. Average commercial efficiency, .887.

It will, therefore, he seen from the above tests, that as long ago as January, 1882, the Edison machine converted into electrical energy 95 per cent. of the indicated house-power expended, and that 88 per cont. of such horse-power was convorted into actual light. Since the

TO EDISON COMPAN GENTLEMEN—" light. It is o very as perfectly safe, in fire a building or caliable to when light and it more than me

GENTLEMEN-I

you lighted with yo

100 No. 1, it is o No.

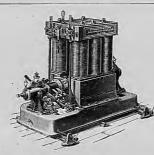
solutely sufe as to fi pense inside of two of lighting my prem

THE EDISON COMP GENTLEMEN-I Dolgoville, Herkins sincere pleasure in [NOT FILMED: PAGES 33-52 (TESTIMONIALS); PAGES 53-59 (LIST OF EDISON ISOLATED PLANTS). THESE ITEMS ALSO APPEAR IN THE EDISON ELECTRIC LIGHT CO. BULLETINS.]

FLOOR SPACE 77×33 INCHES.

HEIGHT: 5 FEET 1 INCH.

WEIGHT: 7,600 POUNDS.



PULLEY:

FACE, 121 INCHES. DIAMETER, 14 INCHES.

REVOLUTIONS: 1,100 PER MINUTE.

65 HORSE POWER.

THE EDISON "H" DYNAMO FOR 400 LIGHTS OF 16 CANDLE POWER EACH.

PRICE LIST.

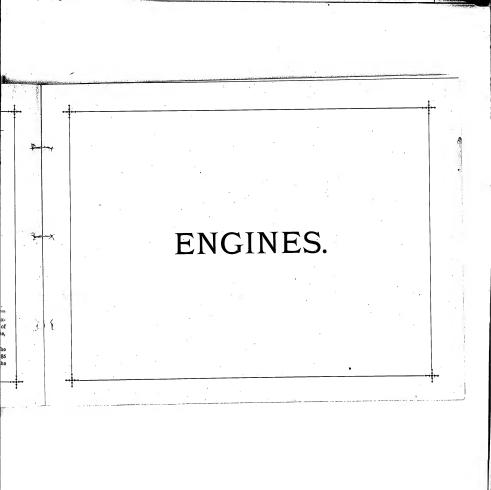
25 Lamp Dynamo ... \$450 00 200 Lamp Dynamo ... \$2,400 00 50 " " 750 00 300 " " " ... 3,450 00 1,850 00 400 " These prices include a full complement of lamps and sockets,

together with a hand regulator for controlling the candle power of the lamps in circuit. The price of fixtures varies according to style and finish. For will be found at the end of this book.

fixtures made for the Edison lamp, together with the prices of same, The remaining item entering into the cost of a plant is the wiring, which in a plant up to 300 lamps capacity will average \$5 per lamp, and in larger plants \$4.75 per lamp, exclusive of the travelling expenses and board of the workmen,

common factory use, however, their cost would probably not ox-

ceed 75 cents per lamp. A catalogue showing the various styles of



ARMINGTON & SIMS SINGLE-DISC ENGINE.

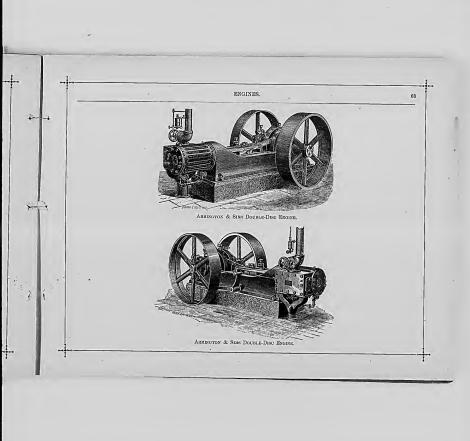


TABLE SHOWING DIMENSIONS, POWERS, AND SPEEDS.

	Сулля	434.	Sr	EED,	INDICATED HOMES. POWERS.	Fay-W	/mess.e.	Det	VING BELTE.	Qya	SIZI		TH-	
	P Diameter,	Stroke.	Revolutions of Crank per Minute.	Velocity of Piston, Feet per Miaute.	Without Condensation.	Inches.	Man of Huckes	Velocity in Feet per Missate.	Width for anyon conden- ing Engines.	WILL	IN WHICH WILL STAMP ING PLY Length, ft. In.			
SINGLE ENGINES.	6.5 8.5 9.5 13. 14.5 12.5 14.5 16.5 18.5 20.	8 10 12 13 13 12 20 24 24 30 30	350 300 275 275 275 300 180 150 120 120	466 500 550 600 600 600 600 600 600	19 35 48 98 123 92 92 124 160 200 236	34 40 47 60 60 60 72 78 84 108 120	5.5 8.5 10.5 13 13 14 20 24 28 30	3120 3120 3370 4300 4300 4700 3390 3300 3400 3770	5 & 5 8 & 6 10 & 8 12 double. 12 " 12 " 13 " 18 " 22 " 26 " 28 "	7 7 9 10 11 10 13 15 16 19 24	0 6 3 0 0 6 6 6 3 6 0	3 4 4 5 5 6 7 8 9 10	000000000000000000000000000000000000000	
DOUBLE ENGINES.	12.5 14.5 16.5 18.5 20.	20 24 24 30 30	180 150 150 120 120	600 600 600 600 600	184 248 320 400 472	84 96 108 120 132	30 26 34 36	3960 3770 4200 3770 4140	20 double. 28 " 24 treble. 32 " 34 "	14 16 17 20 25	9 3 3 0 0	9 10 11 13	00404	

The sizes marked • have two balance-wheels; all others are of style shown on title page.

The indicated horse-powers re those given by an initial ressure of 80 lbs. on the quare inch, cut off at onenarter of the stroke. The ngines are adapted to work nder the highest pressures, required. By the use of itable condensing apparatus, e power of these engines can increased twenty-five per nt. Where engines are used ondensing, a wider-faced heel, adapted to the belts reired, will be furnished. The strain on belting is computed at the rate of thirty-five pounds for each inch in width of single leather belting.

INDICATED HORSE-POWER AT DIFFERENT INITIAL PRESSURES OF STEAM, CUTTING OFF AT .25 OF A STROKE.

DUTTAL.		6.5	x8.	٠			8.5x10.					9.5x12.			PRESSURE.
N E	300 REV.	325 REV.	350 REV.	375 REV.	225 REV.	250 REV.	275 REV.	300 REV.	325 REV.	200 REV.	225 REV.	250 REV.	275 REV.	300 REV.	11
50 55 60 65 70 75 80 85 90	9.3 10.5 11.7 12.9 14.1 15.3 16.5 17.7 18.9 20.1	10.0 11.3 12.6 13.9 15.2 16.5 17.8 19.1 20.4 21.7	10.8 12.2 13.6 15.0 16.4 17.8 19.2 20.6 22.0 23.4 24.8	11.6 13.1 14.6 16.1 17.6 19.1 20.6 22.1 23.6 25.1 26.6	14.9 16.9 18.8 20.8 22.7 24.7 26.6 28.6 30.5 32.5 34.4	16.6 18.7 20.9 23.0 25.2 27.3 29.4 31.6 33.7 35.9 38.1	18.2 20.6 23.0 25.4 27.7 30.1 32.5 34.9 37.2 39.6 42.0	19.9 22.5 25.1 27.7 30.3 32.9 35.4 38.0 40.6 43.2 45.8	21.6 24.4 27.2 30.0 32.8 35.6 38.4 41.2 44.0 46.9 49.7	19.9 22.5 25.1 27.7 30.3 32.9 35.4 38.0 40.6 43.2 45.8	22.4 25.3 28.2 31.1 34.0 36.9 39.8 42.7 45.6 48.5 51.5	24.9 28.1 31.4 34.6 37.9 41.1 44.3 47.6 50.8 54.0 57.3	27.4 30.9 34.3 37.9 41.5 45.1 48.7 52.3 55.8 59.4 63.0	29.9 33.7 37.6 41.5 45.4 49.3 53.1 57.0 60.9 64.8 68.7	50 55 60 65 70 75 80 85 90 95
INITIAL			2.5X12	•			13:	стз.				4.5×13			PKENGEL
- 2	200 REV.	225 REV.	250 REV.	275 REV.	300 REV.	200 REV.	225 REV.	250 REV	275 RHV.	225 REV.	250 REV.	275 REV.	300 REV.	350 REV.	Z.
50 55 60 65 70 75 80 85 90 95	34.4 38.8 43.3 47.7 52.2 56.6 61.1 65.5 70.0 74.5 79.2	38.7 43.7 48.8 53.8 58.8 68.9 73.9 79.0 84.0 89.1	43.0 48.6 54.2 59.8 65.4 71.0 76.6 82.2 87.8 93.4 99.0	47-3 53-4 59-6 65-7 71.9 78.0 84-2 90.3 96.5 102-7 108-9	51.6 58.3 65.0 71.7 78.4 85.1 91.8 98.6 105.4 112.1 118.8	40.2 45.4 50.7 55.9 61.2 66.4 71.7 76.9 82.1 87.4 92.6	45.3 51.1 57.0 62.9 68.8 74.7 80.6 86.5 92.4 98.3 104.2	50.3 56.9 62.5 69.2 75.8 82.5 89.2 95.8 102.5 109.2 115.9	55.7 63.0 69.3 76.7 84.0 91.4 98.8 106.2 113.6 121.0 128.4	56.4 63.8 71.2 78.6 86.0 93.3 100.7 108.0 115.4 122.7 130.0	62.8 71.0 79.2 87.4 95.6 103.8 112.0 120.2 128.3 136.5 144.7	69.6 78.6 87.7 96.7 105.8 114.8 123.9 132.9 142.0 151.1 160.2	75-3 85.1 95.0 104.8 114.6 124.4 134-3 144.1 153.9 163.7 173.5	87.9 99.3 110.8 122.2 133.7 145.1 156.6 168.0 179.5 190.9 202.3	50 55 60 65 70 75 80 85 90 95

INDICATED HORSE-POWER AT DIFFERENT INITIAL PRESSURES OF STEAM.

INITIAL	12.5×20.	14.5×24.	16.5x24.	18.5×30.	20x30.	
PRESSURE.	180 REVOLUTIONS.	150 REVOLUTIONS.	I50 REVOLUTIONS.	120 REVOLUTIONS.	REVOLUTIONS.	PRESSURE
50 55 60 65 70 75 80 85 90 95	51.6 58.3 65.0 71.7 78.4 85.1 91.8 98.6 105.4 112.1 118.8	69.5 78.5 87.6 96.6 105.7 114.7 123.8 132.8 141.9 150.9	89.7 101.4 113.1 124.8 130.5 148.2 159.9 171.6 183.3 195.0	112.8 127.4 142.1 156.8 171.5 186.2 200.9 215.6 230.3 245.0	132.4 149.6 166.9 184.2 201.5 218.8 236.1 253.3 270.5 287.7 304.9	50 55 60 65 70 75 80 85 90 95

In should be noted that these figures are the indicated H. P.: for the degree power, gllowance should be made for the friction of the ongine. Also, that the steam pressure is the initial pressure upon the piston: to obtain this pressure is the continuation of the piston is obtain this pressure it is often necessary to carry a much higher bother pressure if the engine is located at a distance and the steam pipe is too small or crocked; allowance should be made for all this. It is very desirable that the steam pipe should be ample in size, and as short and direct as possible, to obtain the best result.

Engines will be furnished for speed noted, and the Automatic Cutoff Regulator is so constructed that a variation can be made either way within moderate limits, but not to the extreme limits given in the tables; it is, therefore, necessary that about the speed at which the angine is required to be run should be stated. Unless otherwise ordered, the engines will be sent with the regulator adapted to the following speeds: $0.5 \times 8, 50$ Rev.; $0.5 \times 10, 5$

It will be noted that wo give but one speed for each size of the single-wheel engine. We do not recommend other speed than this, but the regulators are adapted to variation ten per cent. oither way, if occasion requires.

Table of Decimal Equivalents of 8ths, 16ths, 32ds, and 64ths of an Inch.

EIGHTHS.	SIXTEENTHS.	ENTHS. THIRTY-SECONDS.			SIXTY-FOURTHS.					
$ \frac{1}{8} = .125 $ $ \frac{1}{4} = .25 $ $ \frac{3}{8} = .375 $ $ \frac{1}{2} = .50 $ $ \frac{6}{8} = .625 $ $ \frac{3}{4} = .75 $ $ \frac{7}{8} = .875 $	$\begin{array}{c} \frac{1}{10} = .0625 \\ \frac{2}{16} = .1875 \\ \frac{2}{16} = .3125 \\ \frac{2}{10} = .4375 \\ \frac{2}{10} = .4375 \\ \frac{2}{10} = .6875 \\ \frac{1}{10} = .6875 \\ \frac{1}{10} = .8125 \\ \frac{1}{10} = .9375 \end{array}$	$\begin{array}{c} \frac{1}{3^{2}} = .03125 \\ \frac{1}{3^{2}} = .09375 \\ \frac{1}{3} = .09375 \\ \frac{1}{3} = .15625 \\ \frac{1}{3^{2}} = .21875 \\ \frac{1}{3^{2}} = .28125 \\ \frac{1}{3^{2}} = .34375 \\ \frac{1}{3^{2}} = .40625 \\ \frac{1}{3^{2}} = .46875 \end{array}$	\$\frac{2}{3} = .71875 \$\frac{2}{3} = .78125 \$\frac{1}{2} = .84375 \$\frac{2}{3} = .90625	a 109375	$\frac{1}{64}$ = .296875 $\frac{1}{64}$ = .328125 $\frac{1}{64}$ = .359375 $\frac{1}{64}$ = .390625 $\frac{1}{64}$ = .421875 $\frac{1}{64}$ = .453125	$\frac{34}{8} = .546875$ $\frac{31}{8} = .578125$ $\frac{34}{8} = .609375$ $\frac{4}{4} = .640625$ $\frac{34}{4} = .671875$	$\frac{81}{64} = .796875$ $\frac{81}{64} = .828125$ $\frac{81}{64} = .859375$ $\frac{81}{64} = .890625$ $\frac{81}{64} = .921875$ $\frac{81}{64} = .953125$			

the his, vay, ENGINES.

"CONSTANTS" OF THE ARMINGTON & SIMS ENGINES, AT DIFFERENT SPEEDS.

Size of Engine.	120 REV.	150 REV.	180 REV.	200 REV.	225 REV.	250 REV.	275 REV.	300 REV.	325 REV.	350 REV.	375 REV.
6.5 x 8 8.5 x 10 9.5 x 12 12.5 x 12 13. x 13 14.5 x 13 12.5 x 20 14.5 x 24 16.5 x 24 18.5 x 30 20 x 30	2.3728 3.0779 4.8309 5.6545	1.8333 2.9660 3.8474 6.0386 7.0681	1.3200 1.5451 1.9279 2.2000 3.5592 4.6169	.8484 1.4666 1.7166 2.1419 2.4442	.6363 .9545 1.6500 1.9313 2,4098 2.7500	.3283 .7071 1.0606 1.8333 2.1459 2.6777	.3619 .7777 1.1666 2.0166 2.3605 2.9452	·3947 .8484 1.2727 2.2000 2.5751 .3.2131	.4276 .9191 1.3787 2.3833 2.7897 3.4811	.4606 .9900	4934

Multiply the Constant opposite the Engine Speed, by the M. E. P. of the Indicator Card, and the product is the H. P.

AREAS OF CIRCLES IN SQUARE INCHES. .

Rule. - Square the diameter in inches and multiply by .7854.

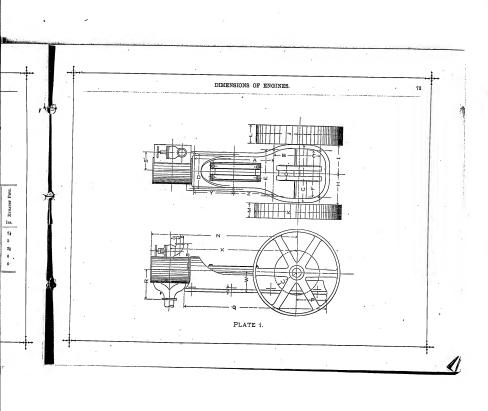
FOR TABLE OF DECIMAL EQUIVALENTS SEE NEXT PAGE.

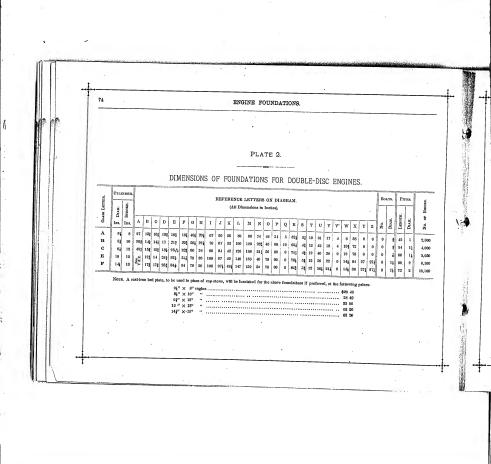
M	F	D	TATION	an	INDICATOR	CDDING

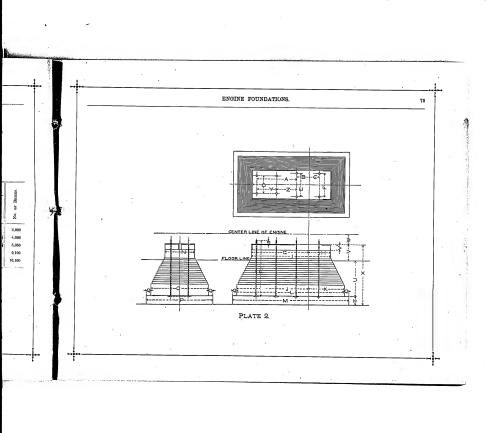
LENGTH. In.	.1	.2	.8	.4	.5	.6	.7	.8	.9
2.75	2.1818	4.3636	6.5454	8.7272	10.9091	13.0909	15.2727	17-4545	19.636
2.80	2.1429	4-2857	6.4286	8.5714	10.7143	12.8571	15.0000	17.1428	19.285
2.85	2.1053	4.2105	6.3158	8.4210	10.5263	12.6316	14.7368	16.8421	18.9473
2.90	2.0690	4-1379	6.2060	8.2758	10.3448	12.4138	14.4827	16.5517	18.6206
2.95	2.0339	4.0680	6.1017	8.1360	10.1695	12.2033	14.2372	16.2719	18.3050
3.00	2.0000	4.0000	6.0000	8.0000	10.0000	12,0000	14.0000	16.0000	18.0000
3.05	1.9672	3-9344	5.9016	7.8688	9.8361	11.8033	13.7705	15.7377	17.7049
3.10	1.9355	3.8710	5.8064	7.7419	9.6774	11.6120	13.5484	15.4838	17.7049
3.15	1.9048	3.8095	5.7143	7.6196	9.5238	11.4286	13.3333	15.2381	17.4193
3.20	1.8750	3.7500	5.6250	7.5000	9-3750	11.2500	13.1250	15.0000	17.1428
3.25	1.8462	3.6923	5-5384	7.3846	9.2308	11.0769	12.9231	14.7692	16.8750
3.30	1.8182	3.6364	5-4545	7.2727	9.0909	10.0001	12.7273		16.6154
3.35	1.7910	3.582r	5.3731	7.1642	8.9552	10.7462	12.5373	14-5454	16.3636
3.40	1.7647	3.5294	5.2941	7.0588	8.8235	10.5882	12.3529	14.3283	16.1193
3-45	1.7391	3.4783	5.2174	6.9565	8.6957	10.4348	12.1739	14.1176	15.8823
3.50	1.7143	3.4286	5.1428	6.8571	8.5714	10.2857	12.0000	13.9130	15.6522
3.55	1.6001	3.3803	5.0704	6.7606	8.4507	10.1408	11.8310	13.7142	15.4285
3.60	1.6667	3-3333	5.0000	6.6667	8.3333	10.0000	11.6667	13,5211	15.2113
3.65	1.6438	3.2877	4-9315	6.5753	8.2191	9.8630	11.5068	13-3333	15.0000
3.70	1.6216	3.2432	4.8640	6.4865	8.1081	9.7297		13.1506	14.7945
3.75	1.6000	3.2000	4.8000	6.4000	8.0000	9.6000	11.3513	12.9730	14.5946
3.80	1.5789	3-1579	4.7368	6.3158	7.8947		11.2000	12.8000	14-4000
3.85	1.5584	3.1160	4.6753	6.2338	7.7922	9-4736	11.0526	12.6315	14.2105
3.90	1.5385	3.0769	4.6154	6.1538	7.6923	9.3506	10.9091	12.4675	14.0260
3.95	1.5100	3.0380	4-5569	6.0759	7.5949	9.2308	10.7692	12.3077	13.8461
4.00	1.5000	3.0000	4-5000	6.0000	7.5000	9.1139	10.6329	12.1518	13.6708
4.05	1.4815	2.9630	4-4444			9.0000 8.888g	10.5000	12.0000	13.5000
4.10	1.4634	2.9268	4-3902	5.9259	7-4074		10.3704	11.8518	13-3333
4-15	1.4458	2.8916	4-3373	5.8536 5.7831	7.3170	8.7804	10.2438	11.7072	13.1706
4.20	1.4286	2.8571	4-2857			8.6747	10.1205	11.5662	13.0120
4.25	1.4118	2.8235		5.7x4x	7.1428	8.5714	10.0000	11.4285	12.8570
10		2.0235	4-2353	5.6469	7.0588	8.4706	9.8823 1	11.2941	12.7058

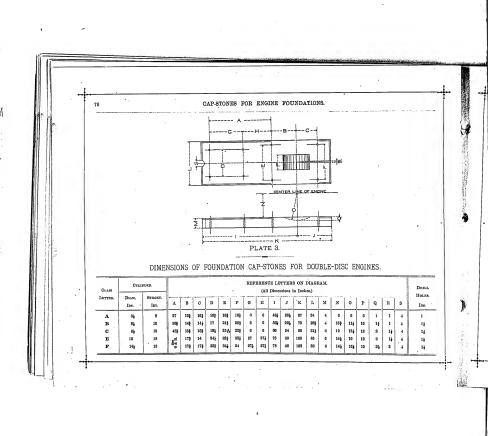
M. E. P. WITH 40 INDICATOR SPRING.

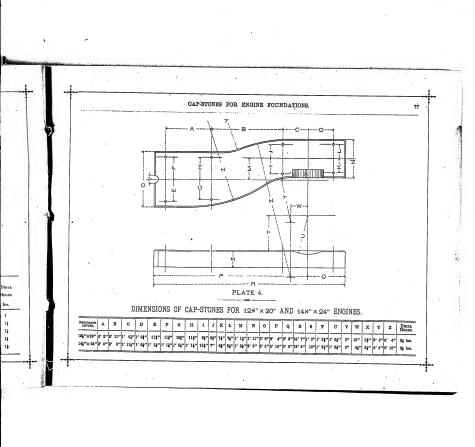
Lengtia. In.	.1	.2	.8	.4	.5	.6	.7	.8	.9
2.75	1.4545	2.9091	4.3636	5.8182	7.2727	8.7273	10.1818	11.6364	13.0900
2.80	1.4286	2.8571	4.2857	5.7143	7.1429	8.5714	10,0000	11.4286	12.8571
2.85	1.4035	2.8070	4.2105	5.6140	7.0175	8.4210	9.8246	11.2281	12.6316
2.90	1.3793	2.7586	4.1379	5.5172	6.8966	8.2759	9.6552	11.0345	12.4138
2.95	1.3559	2.7119	4.0678	5.4237	6.7797	8.1356	9.4915	10.8474	12.2034
3.00	1.3333	2.6667	4.0000	5-3333	6.6667	8.0000	9-3333	10.6667	12,0000
3.05	1.3115	2.6229	3-9344	5.2459	6.5574	7.8688	9.1803	10.4918	11.8033
3.10	1.2003	2.5806	3.8710	5.1613	6.4516	7.7419	9.0323	10.3226	11.6120
3.15	1.2698	2.5397	3.8095	5.0794	6.3492	7.6191	8.8889	10.1587	11.4286
3.20	1.2500	2.5000	3.7500	5.0000	6.2500	7.5000	8.7500	10.0000	11.2500
3.25	1.2308	2.4615	3.6923	4.9231	6.1538	7.3846	8.6154	9.8462	11.0769
3.30	1.2121	2.4242	3.6364	4.8485	6.0606	7.2727	8.4848	9.6970	10.9001
3.35	1.1940	2.3981	3.5821	4.7961	5.9701	7.1642	8.3582	9.5922	10.7463
3.40	1.1765	2.3529	3.5294	4.7059	5.8824	7.0588	8.2353	9.5922	10.7403
3-45	1.1594	2.3188	3.4783	4.6377	5-7971	6.9565	8.1159	9.4118	10.5882
3.50	1.1429	2.2857	3.4286	4.5714	5.7143	6.8571	8.0000	9-2754	10.4348
3.55	1.1268	2.2535	3.3803	4.5070	5.6338	6.7606	7.8873	9.1428	10.2857
3.60	1.1111	2,2222	3.3333	4-1444	5.5555	6.6667		8.8889	10,1408
3.65	1.0959	2.1918	3.2877	4.3836	5-4794	6.5753	7.7778 7.6712	8.7671	9.8630
3.70	1.0811	2.1622	3.2432	4.3243	5-4054	6.4865	7.5676	0.7071	
3.75	1.0667	2.1333	3.2000	4.2667	5-3333	6.4000	7.4667	8.6486	9.7297
3.80	1.0526	2.1053	3.1579	4.2105	5.2631	6-4000	7.4007	8.5333	9.6000
3.85	1.0390	2.0779	3.1160	4.1558	5.1948	6.3158	7.3684	8.4210	9.4737
3.90	1.0256	2.0513	3.0760	4.1026	5.1282	6.2338	7.2727	8.3117	9.3506
3.95	1.0127	2.0253	3.0380	4.0506	5.0633	6.1538	7.1795	8.2051	9.2308
4.00	1.0000	2.0000	3.0000	4.0000	5.0000	6.0759		8.1013	9.1139
4.05	.9877	1.9753	2.9629	3.9506	5.0000		7.0000	8.0000	9.0000
4.10	.9756	1.9512	2.9268		4.9382 4.8780	5-9259	6.9135	7.9012	8.8888
4.15	.9639	1.9277	2.8915	3.9024	4.8102	5.8537	6.8294	7.8048	8.7604
4.20	9524	1.9047		3.8554		5.7831	6.7469	7.7108	8.6746
4.25	93-4	1.8823	2.8571	3.8094	4.7617	5.7143	6.6664	7.6188	8.5711
4.25	.9412	1.0023	2.8235	3.7646	4.7057	5.6471	6.5883	7.5292	8,4703

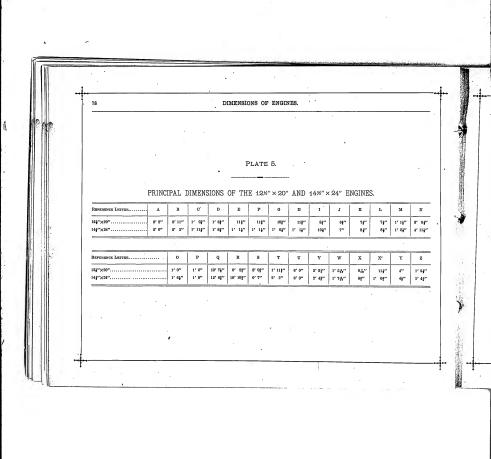


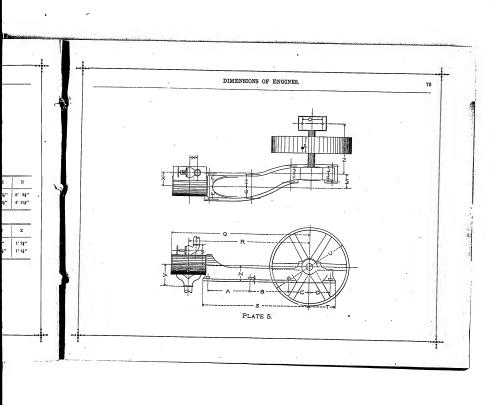


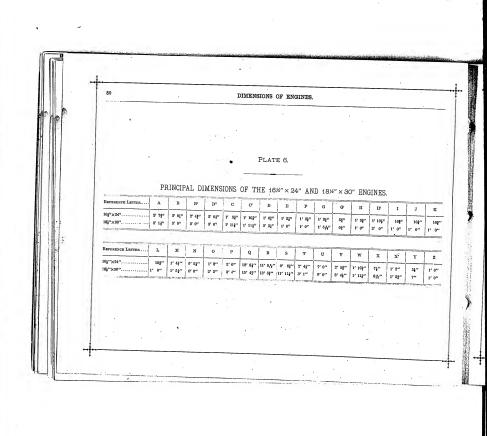


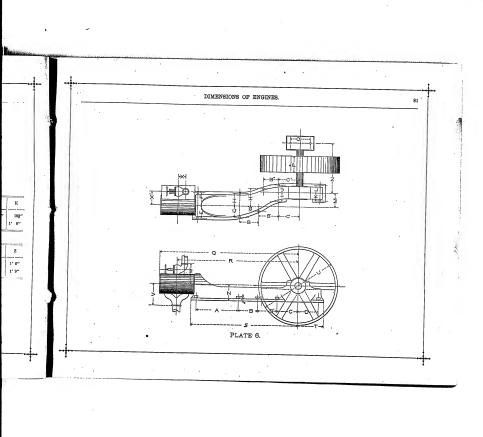


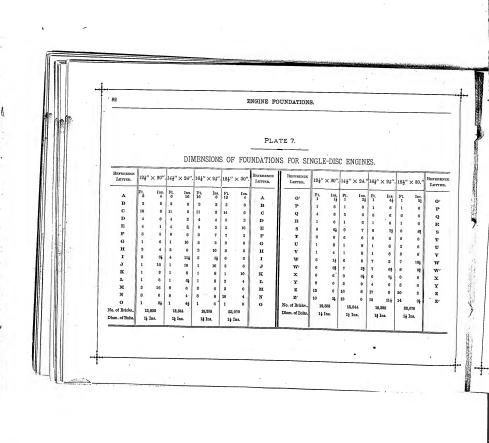


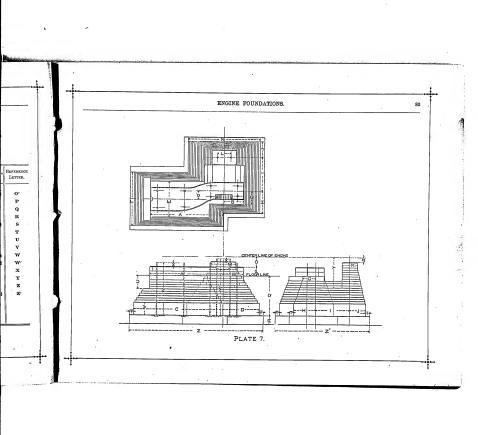


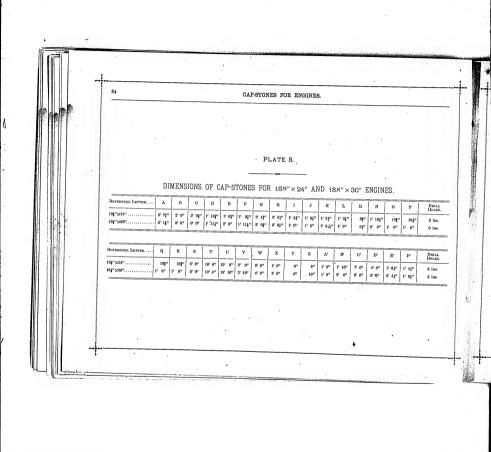


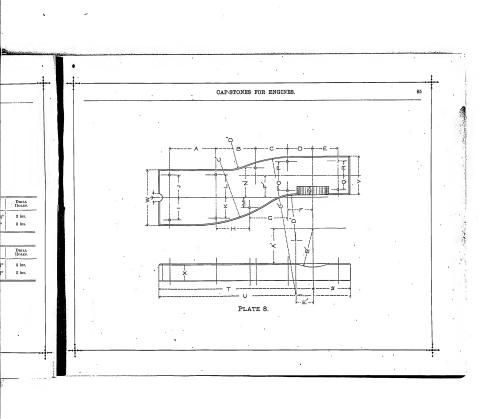


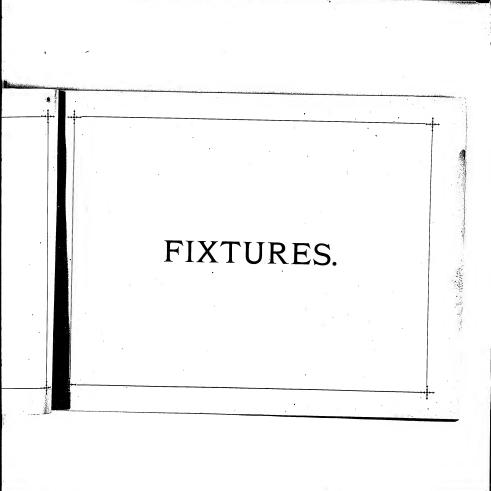












CATALOGUE AND PRICE LIST

-OF-

EDISON LIGHT FIXTURES,

MANUFACTURED BY

Messrs. BERGMANN & CO.

292 to 298 AVENUE B, NEW YORK CITY

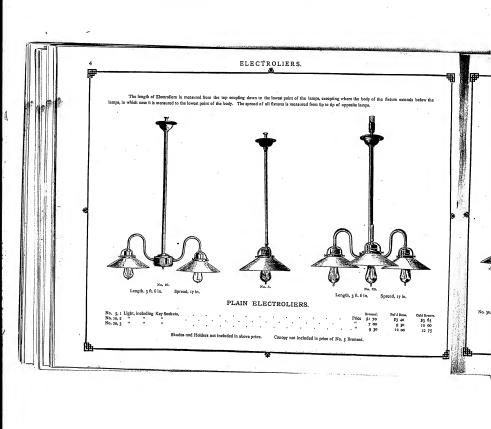
These Electroliers, Brackets, etc., are especially designed for the Edison Incandescent Electric Lamp. They are provided with the standard sockets and wired in the best manner, in accordance with the requirements of the Board of Fire Underwriters and the rules laid down by the Engineering Department of the Edison Company. There is a large variety of designs of various prices, from which selections can be made suitable for all classes of work.

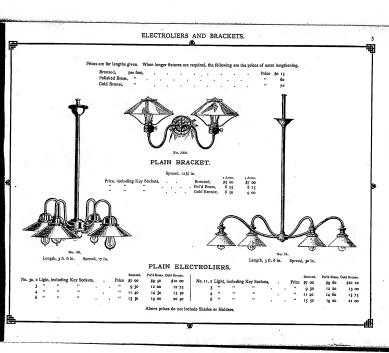
Most of the devices and fixtures illustrated in the following catalogue are manufactured and sold under patents which are controlled exclusively by the Edison Company and Messrs. Bergmann & Co., and the public are respectfully cautioned against all infringements of the same.

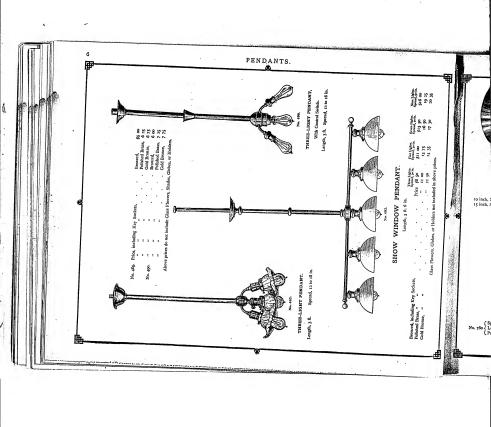
The illustrations in the catalogue represent only such leading styles of fixtures as its space permits us to show.

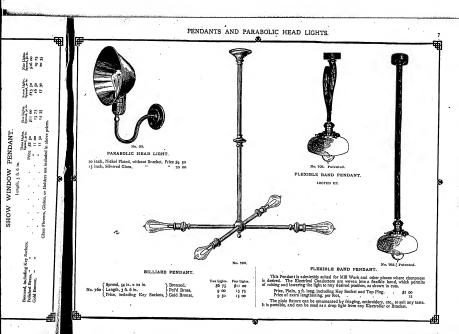
It will be observed that the use of the Edison Incandescent Light offers a wider field for ornamentation in Electroliers,

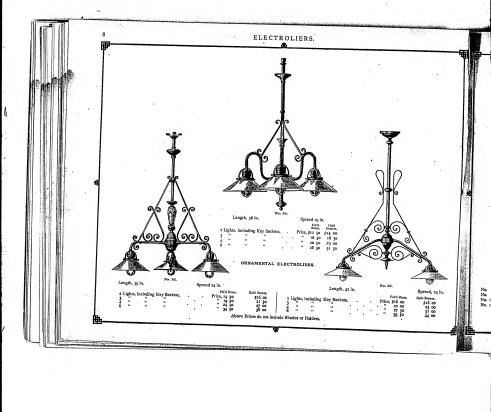
Brackets, etc., than that of gas. Special designs and estimates for all styles and classes of work will be furnished.



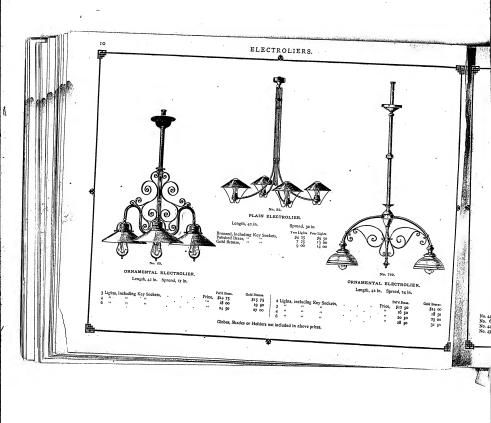


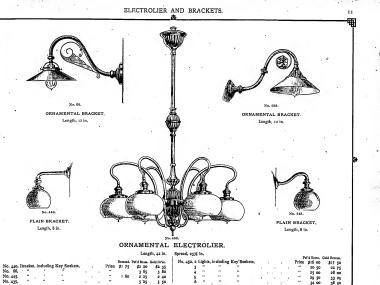




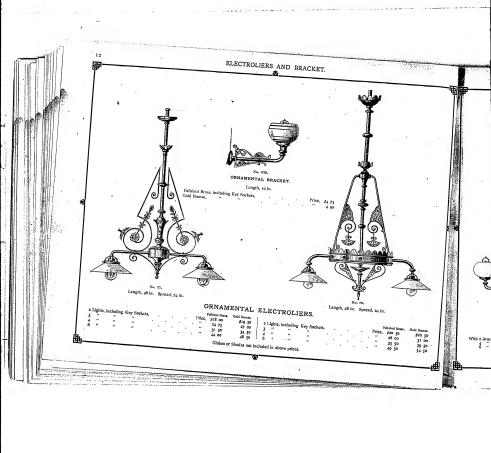


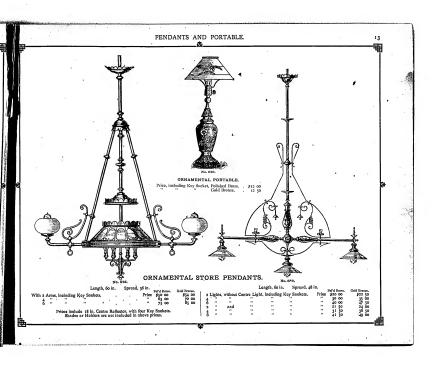
ELECTROLIERS, HAND LAMP AND BRACKET. PLAIN BRACKET. HAND LAMP. ORNAMENTAL ELECTROLIER. ORNAMENTAL ELECTROLIER. · Length, 42 in. Spread, 17 in. Shades and Holders not included in above prices.

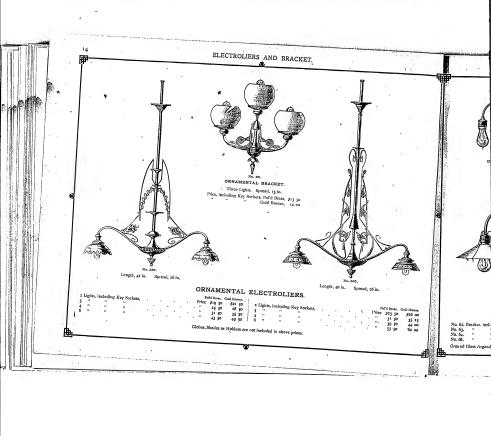




- CONTROL OF THE PROPERTY OF T











ORNAMENTAL BRACKET. Length, 12 in.



ORNAMENTAL BRACKET. Length, 12 in.



PLAIN BRACKET. Length, 12 in.



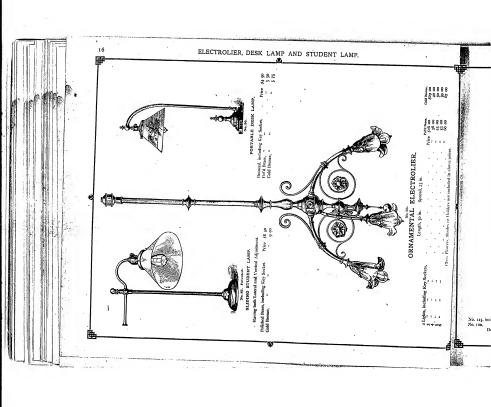
PLAIN BRACKET. Length, 8 in.

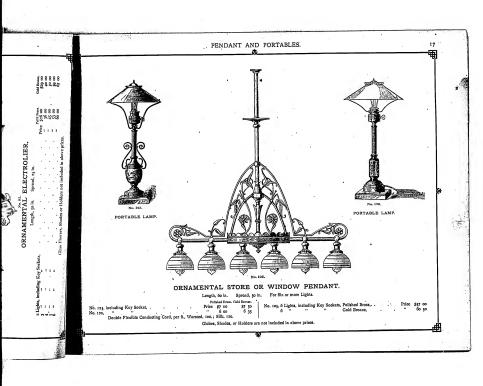
ORNAMENTAL NEWELL.

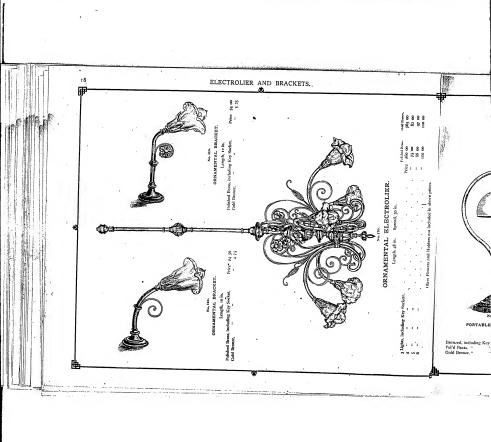
Helght, 69 in. Spread, 20 in.

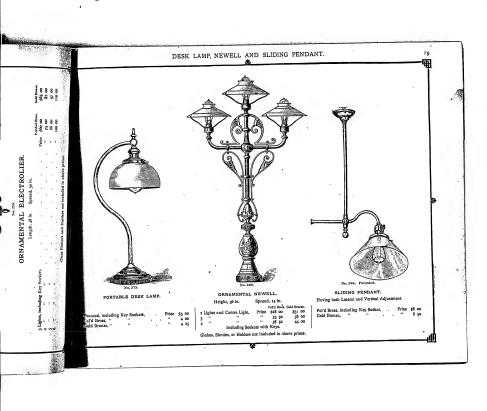
								Poi'd Bress, G	ield lirenze.	1							Pol'd Brass.	G.
		including l		et, .	Pr	icc \$1	90	\$2 35	\$2 50	No. 605, 2 L	ights	and Centre	Light,	Including	Kcy Sockets,	Price	\$60.00	
No. 63,	. "	**						3 00	3 20	No. 605, 3	7.		, .				68 to	
No. 64,	. "							3 75	3 90	No. 601, 4					**	**	77 00	
No. 68,	. "		**				80	2 25	2 40	1					_		//	
Ground	n in No	. 68,				40.	1	Glo	bes, Shades	or Hole	ders åre n	ot included in	above	prices.				

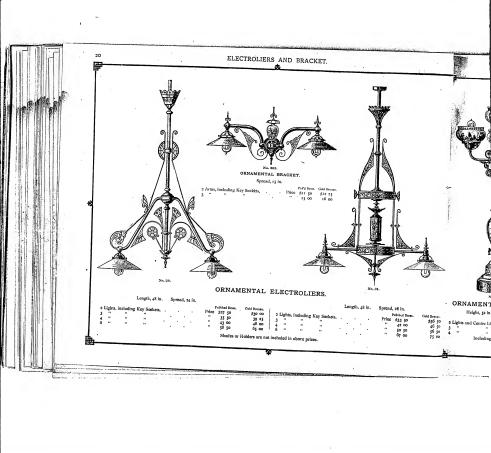


















SWINGING DESK STAND LIGHT.

Height, 18 in. Spread, 24 in.



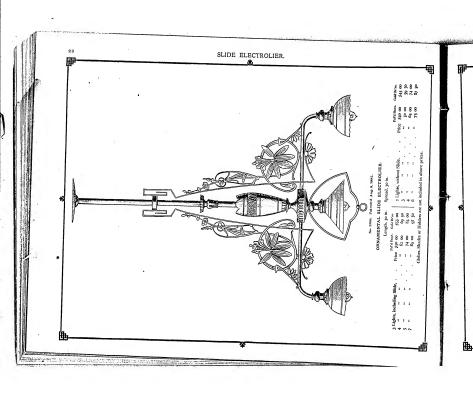
TWO-LIGHT SWINGING BRACKET.

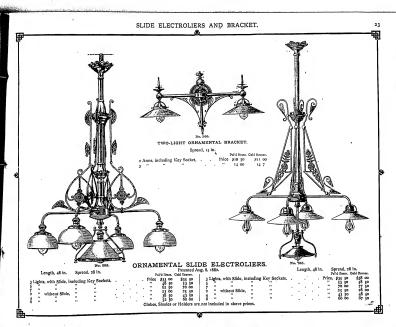
Including Key Sockets.

\$12 50 \$12 00 16 75 17 50 7 85 7 50 10 50 8 85 8 50 10 50 13 25 13 75

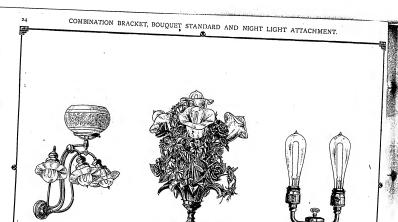
Globes, Slindes or Holders are not included in above prices.

ORNAMENTAL NEWELL.





£8282



Pateroed April 18, 1882, and Aug. 8, 1882. THREE-LIGHT COMBINATION ELECTRIC LIGHT AND GAS BRACKET.

\$11 00 8 go 8 8o 6 go

Including Key Sockets.

FOUR-LIGHT BOUQUET STANDARD.

Height, 25 in.

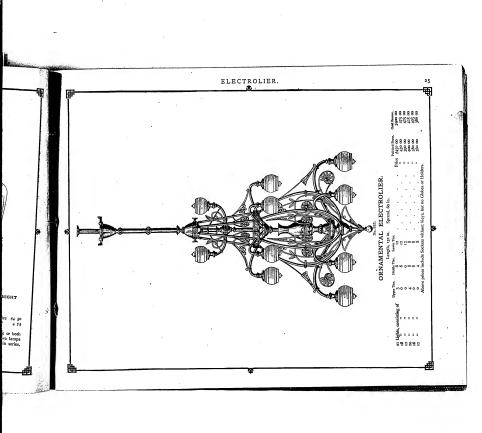
Polished Brass, including Key Sockets, Price \$160 co

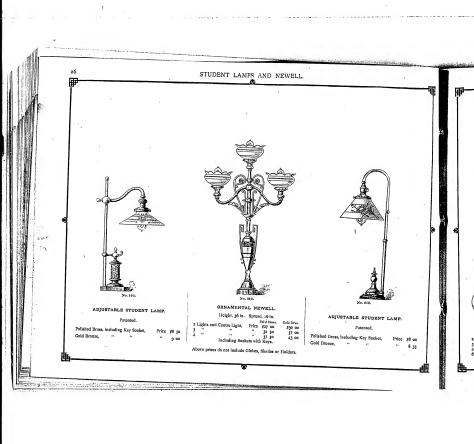
Glass Flowers or Globes are not included in above prices.

TWO-LIGHT ATTACHMENT FOR NIGHT LIGHTS.

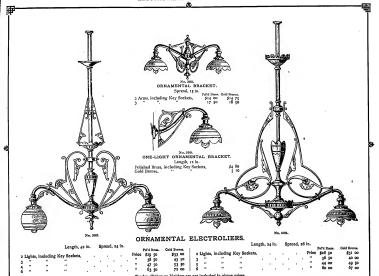
Will fit any Socket. Polished Brass, including Key Sockets, Gold Bronze,

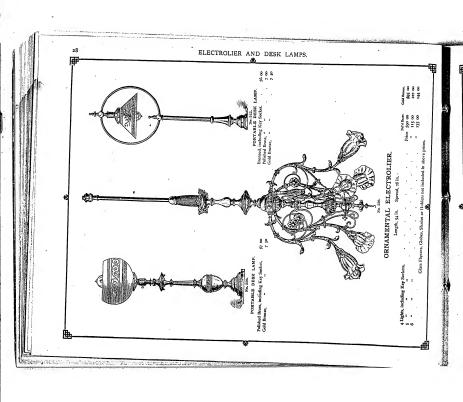
This device permits of using either one or both lamps at the full candle power, or else the two lamps may, by means of the centre switch, be put in series, thus bringing them down to a red glow.





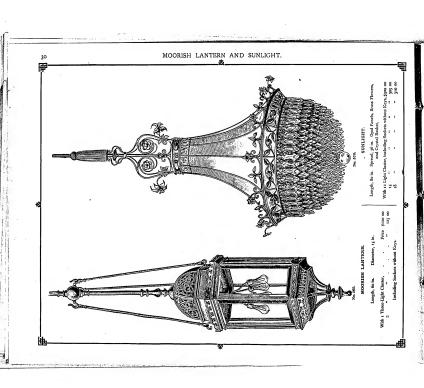






\$95 121 8 8 8 144 8 8

%0 00 115 00 135 00



Spread, 36 in. Opal Panels, Brass Flowers and Crystal Basket,



ORNAMENTAL SCONCE.

Sire, 29 x24 in.

Polished Brass Oval Repoissé Frame, Beveled Glac

Mirror, with Bracket for a Lamps, mounted
on Peacock filme.

Price_including Sockets and Glass Flowers. \$125.0

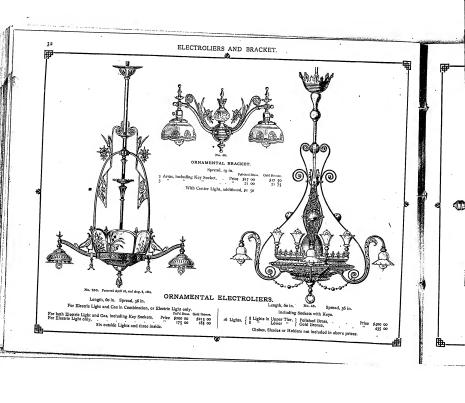


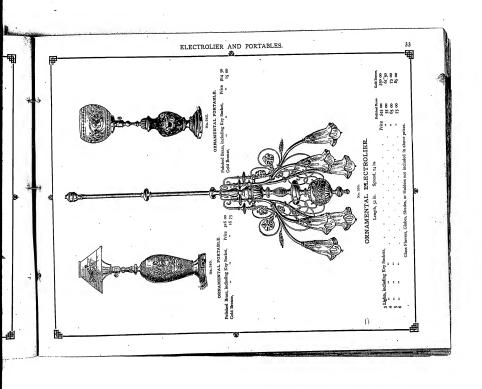
ORNAMENTAL HALL LIGHT.

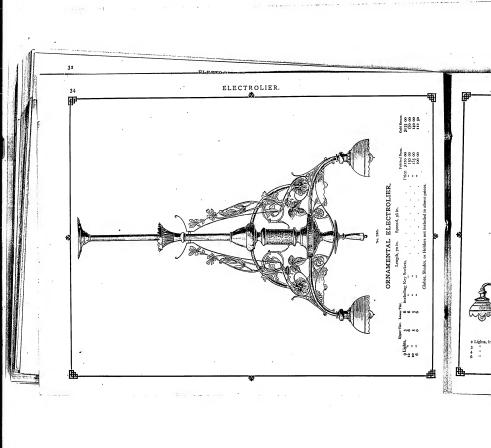
Open Repense Work Metal Dome, with Silk Fringe. Length, 60 in. Diameter at Fringe, 22 in. Four-Light Cluster, with Key Sockets, Price \$240 00

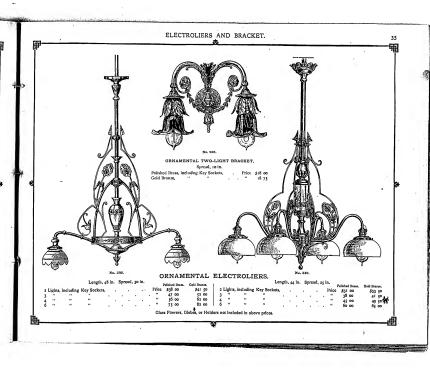


ORNAMENTAL READING LAMP. With Crimson Silk Shade and Fringe.

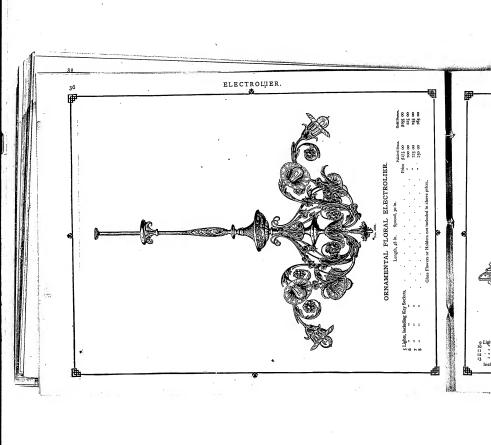


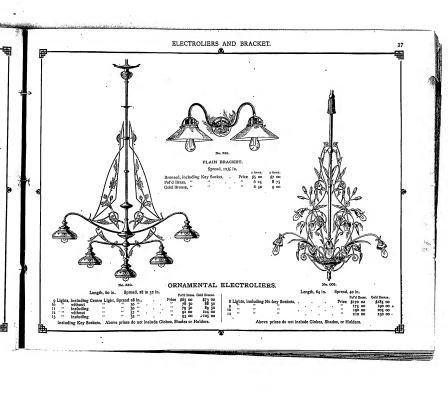


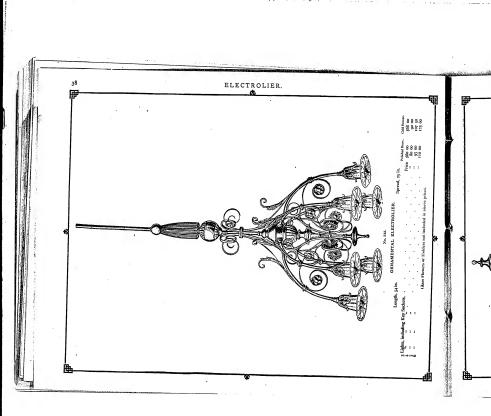


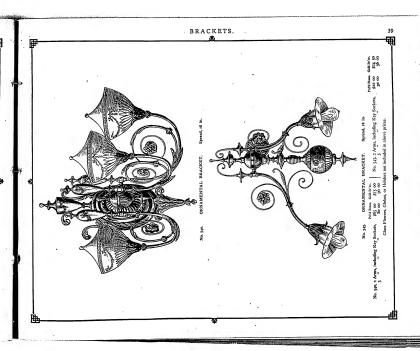


State Brease, \$135.00 170.00 140.00 112.50



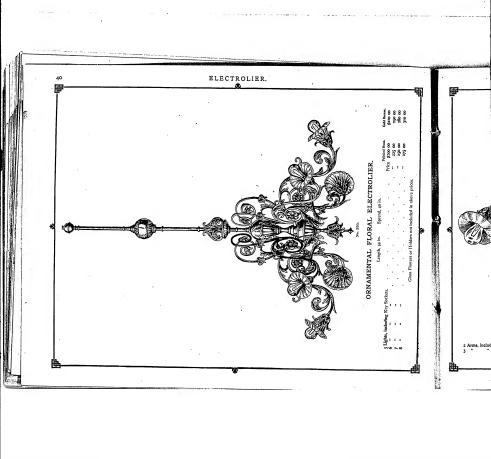


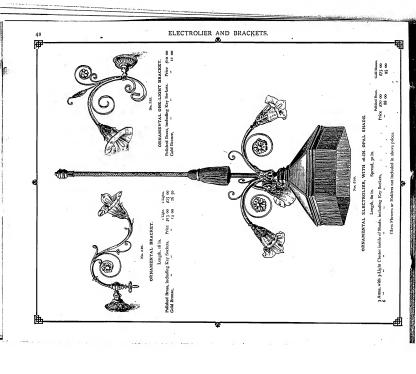




ORNAMENTAL ELECTROLIER.

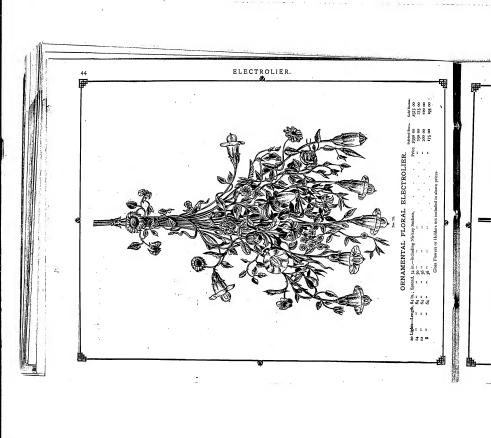
Geld Broase, \$68 00 90 00 107 50 125 00

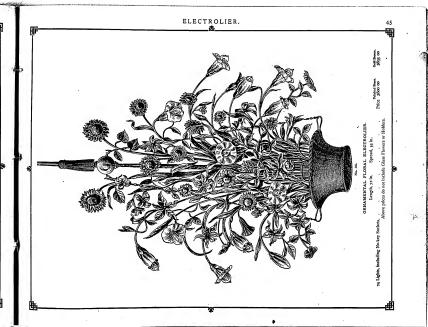




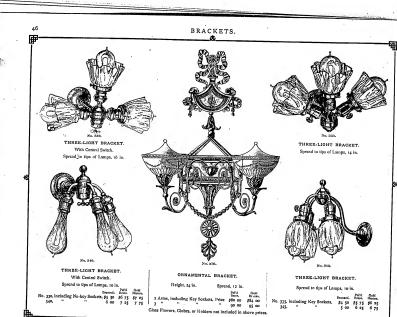
88

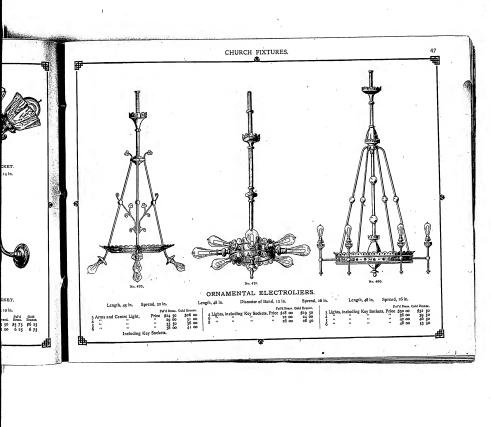
Glass Flowers or Holders not included in above prices.

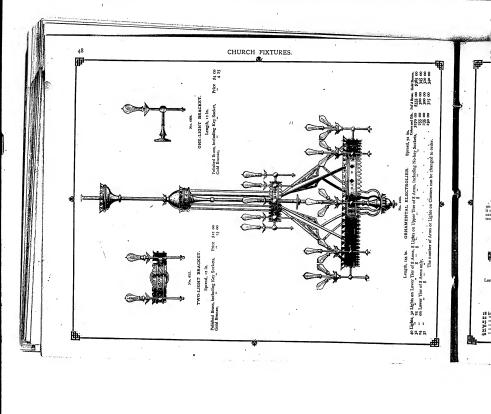


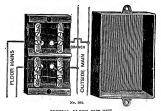


: : : 3333 ± 2 ∞









SPECIAL FLOOR CUT-OUT,

po Dighta, y Lighta on Lower, Tire of 8 Arms, Lights on Upper, Tire of 8 Arms, including No-try Sockets, Sprace 12 and Lower Tire of 8 Arms only. The number of Arms or Lights on Clusters can be changed to order.

Patented May 2 and Sept. 12, 1882. For Concealed Work.

. The above represents a safety cut-out to be used for concealed work. It is placed under the flooring where the main wires enter the room and a pocket arranged so that it may be readily accessible. This scut-out is useful for testing purposes as well as on account of its safety catch. It will be seen that both poles can be disconnected and the trouble easily located.



PATENT SOCKET KEY TURNER.

Price \$4 00 To order, of any length desired.

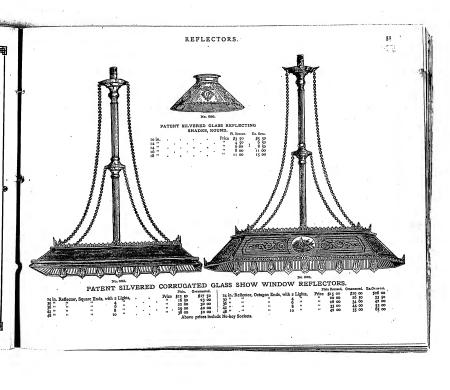


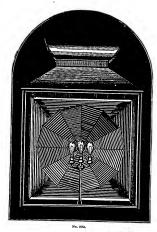
PATENT SILVERED CORRUGATED GLASS CONE REFLECTOR.

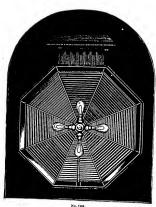
								Plain Brenze,	Ome, as in cut.										Pisin Bronet,	
18 In	Reflector.	A Lights.					Price		\$22 00	50 in1	Reflect		Lights	٠.				Price		\$90.00
22 "	11.	4			٠.		"	22 00	26 00	. 60 "		24	"					. :	90 00	165 00
25 "	* 86	ĕ "	٠.					28,00	33 00	72 "		. 30	::	• .			••		175 00	225 00
3ó "	"	8 "					• ::	35 00	42 00	84 "		72	**	1111					250 00	100 00
35 "		10 "		٠,				. 44 00/-	70.00	90 -		72		Prices in	dude S	ockets 1	vithou	Kevs.	.,	300 00









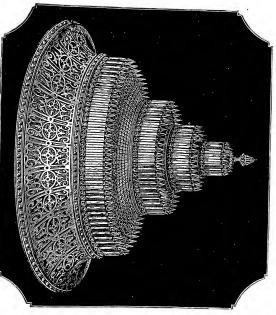


PATENT SILVERED GLASS REFLECTING HEADLIGHTS.

15 in. Diameter, with Cluster of Four Lights, including Key Sockets,

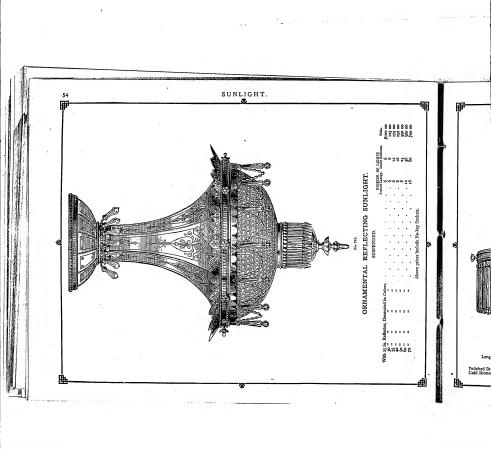
Price \$25 00 " 30 00 No. 705. \$27 00 32 50

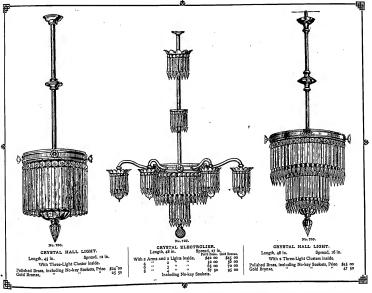


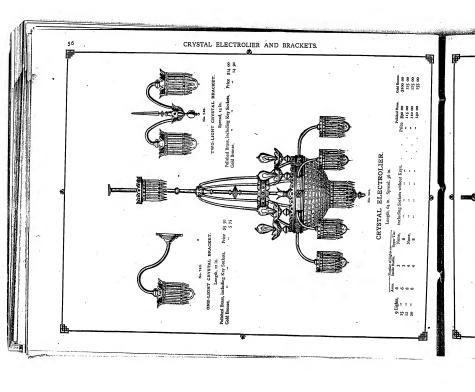


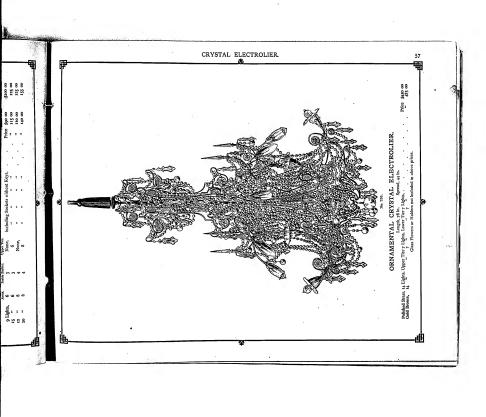
ORNAMENTAL REFLECTING SUNLIGHT, 3E INSERTED IN CEILING.

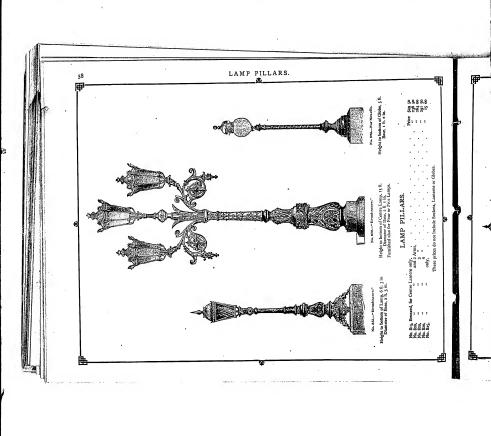
					TO BI	m
Sunlight	with 25 in.	Reflect	or, 6 Lights.			
:	:	:				
:	:	:		•		٠
:	35	:			•	
	1	•		•		٠
:	3.5	:			•	
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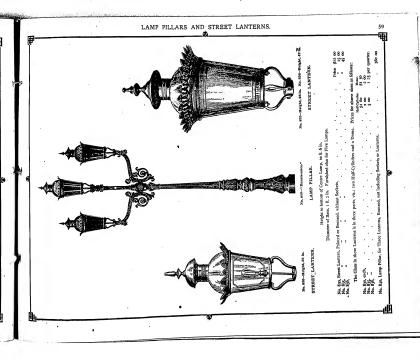












22828. Fritz

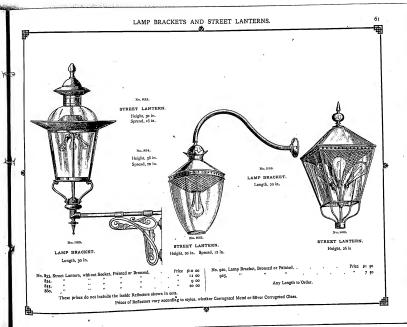


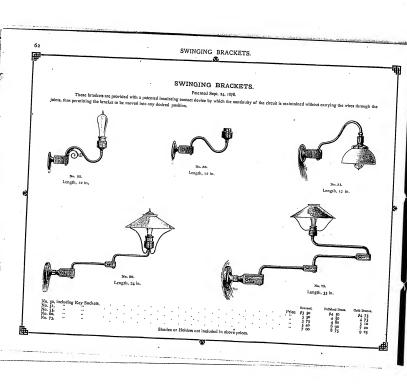


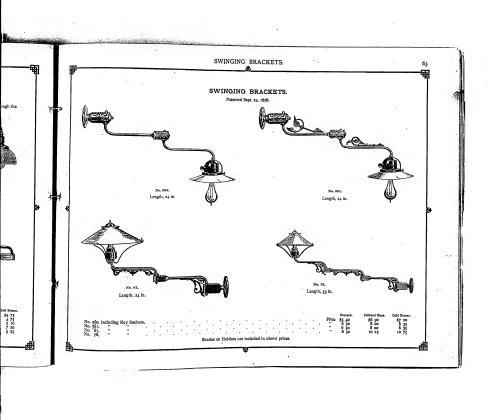


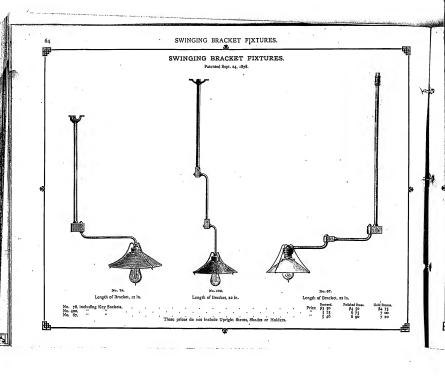
LAMP PILLAR.
Height to bottom of Centre Lamp, 9 ft. 5 in., Base, 10 /s
in. square.
No. 845, Lamp Pillar, for 3 Lamterns, Bronsed,
No. 845, 5 72 00
No. 846 Lamberns, Dronsed,
No. 861 including Sockets or Lanterns.

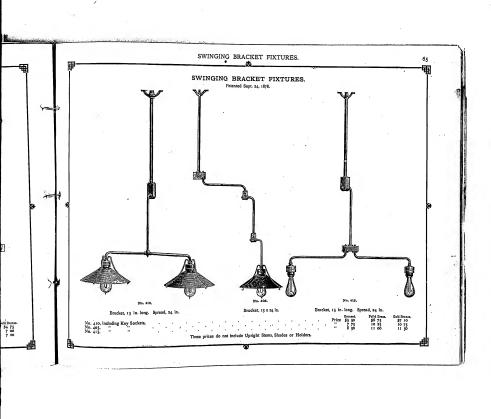


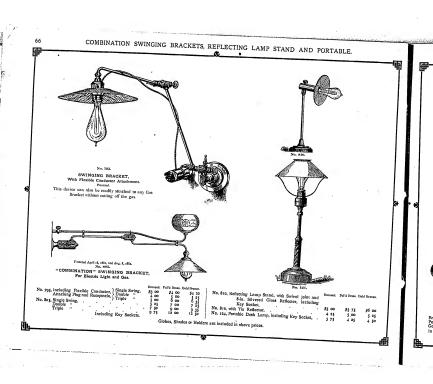


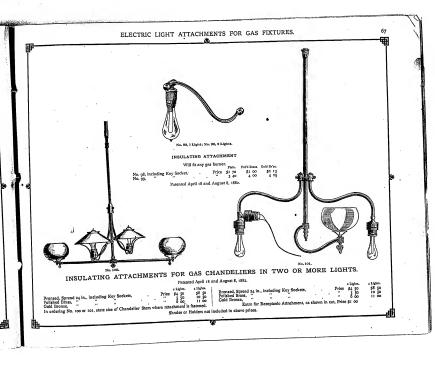


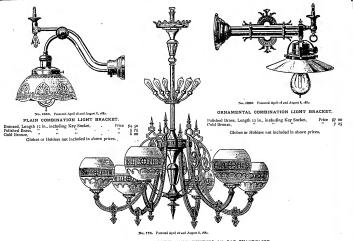












SHOWING CLUSTER OR CORONA OF LIGHTS. ATTACHMENTS ON GAS CHANDELIER.

Made in halves, which can be readily attached to any Chandelier. In ordering state size of gas pipe and covering tube in gas fixture. Lights can be turned down or up.

8 Lights, including No-Key Sockets,





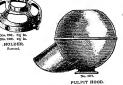




PATENTED CORRUGATED METAL REFLECTING SHADES.

Nickel Plated.







138,43

PLAIN PORCELAIN SHADE.

DE.

DECORATED PORCELAIN SHADE.

No. 194.	Corre	rates	Lateral	Refl	ecto	r. Ni	ckel	Plat	ed.	to it	١.,					30	
No. 10114	Wine	Mole	lor eler	wn n	0 50	me.	16. 1	. or	3%.								10
No. 193,	Corre	onte	I Meta	1 Ref	lecto	or. N	ickel	Plat	ted,	10	in.,	can	bu :	attacl	hed		_
		Serie	bet wit1	iont s	enal	rate l	holde	r.									28
No. 106.	Serna	D.	flector,	6 in	hie	h. w	ill fit	336	in.	hole	der,						22
No. 197	Pulpit	Ho	od, witi	h Insi	de F	teflo	tor,									3	00
					_			_	_			,	ara B	rass.	Go!	d Bro	nre.
ý 1		/			-	_			-			,	ard II \$0		Gol	d Bro \$0	32
	lolder,	31/	in.,			-		ner.				,	\$0		Gol		32 25
No. 201,		314	in., wit		ber	Sere		ing,	-				\$0	30	Gol		32
No. 201 No. 202		3 X 2 X	in., wit in.,			-	w R	ing,	-				\$0	30 22	Gel		32 25 22 14
No. 200, H No. 201, No. 202, 10-in, Plali 10-in, Port	" Wire	3¼ 2¼ Ho	in., wit in., ider,	. '	ber .	Sere		ing,	-				\$0	30 22 20 .	Gol		32 25 22

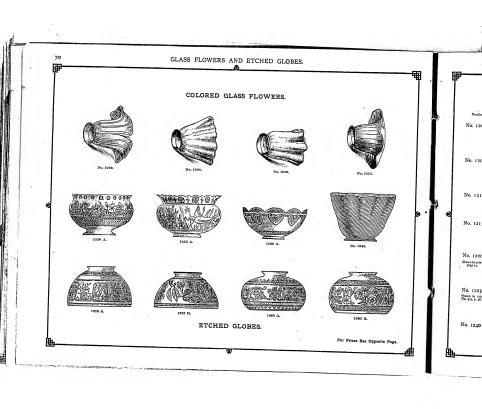
				CELA	IIN :	SHA	DES				1	rice	per i	
No. tos.	Porcelain	Shade.	to in, fla	nt, .									\$4	0
			10 in. hi	igh (shr	ape of	No. 1	98).						+	2
	**	**	8 in. fle	at	٠.								3	7
		**	8 in, hi	gh.									4	0
No. 198,	Decorated	l Porce	lain Sha	des, in	great	vari	ety of	styl	ن ک	nd	price	s,		
	A. Decera	ted on	White G	round.									10	
	В. "		**										- 11	
	C. "		**	**									13	5
	B. :		Tinted	**									20	
	E. "		**	••									34	٥
	F. "		**	**									40	0
					_							Pri	ice pe	r I

Patent Clinch Staples, 14.

ed down or up.

Po'd Bress, Gold Br
\$12 00 \$12
14 00 15

BRACKET.



GLASS FLOWERS.

ETCHED GLOBES.

	Number. Style No. 1200 { A B C	White Pink, Glass Flowers White Yellow, Pale Green, State of the Control of the C	Sire. Price per Day. in. long. \$21 50 18 50 16 50	No. 1285 { " Squat " Etched Globes,	Price per Des.
	No. 1205 No. 1205 No. 1205	Pearl, 5	½ in. long. 19 oc in. spread. 16 50 in. long. 20 50	No. 1260 Scolloped Pan" Etched Globes,	12 25 12 50 13 00 14 50 15 00 16 00
	`	Pearl,	in. spread. 18 oc 18 oc in. long. 16 50 in. spread. 15 50 15 50	No. 1250 { "Crown" Etched Globes, } 7 in.	16 00 16 00 16 50
18		Ruby,	4 in. long. 18 oc 18 oc		17 50 18 00
	No. 1220 Shown in cents, 1988 21.	Ruby, Corrugated Dark Amber, Clear Amber, Opalescent, Pearl,	in. long. 19 50 in. spread. 16 50 16 50	(8 in.	3 75 4 00 4 50 4 00
	No. 1225 A B C Shown in cut No. 245, p. 46 D	Ruby,	in, long. 16 50 in, spread. 16 50 16 50	No. 1170 Decorated Opin Groups, in great variety of styles and prices, among which are— A, Decorated on White Ground, 7½ in. B, "Tinted" 7½ in. C, "" 7½ in.	15 00 18 50 32 00 42 00
	No. 1240 ABC CD	Ruby,	n, spread. 28 50 26 50 25 00 27 50 27 50	In ordering Etched or Decorated Globes, state whether	42 00

Opposite Page.

Patented.



STANDARD NO-KEY SOCKET. Patented Dec. 27, 1881, and May 2, 1882. Canadian Patent, Jan. 10, 1883.



STANDARD RECEPTACLE. Patented Dec. 27, 1881, and May 2, 1882. Canadian Patent, Jan. 10, 1883.



STANDARD ATTACHING PLUG. Patented.



STANDARD KEY SOCKET. Patented Dec. 27, 1881, and May 2, 1882. Canadian Patent, Jun. 10, 1883.











Patented May 2, 1882, in the United States and Canada.

							Fish.	Pol'd Brass, Ge	
	No-Key Soeket,					Price	\$0 40	50 46	\$0 48
No. 2. "	Key Socket,						82	go	92
No. 3. "	Receptacle, .					••	40	44	46
No. 4, "	Attaching Plug,					**			40
Standard	Polished Brass o.	r Gold	Bro	nze	Soc	kets an	1/4 three	nd, Standard	Plain
Sockets are 1/4.	¼, or ⅓, as desir	ed.							

lo. 210, Stand		, ı to	6	Lights,	Price	Main. \$2 35	Pord Bras. \$2 50	Gold fir'se. \$2 60	Nic. Pla. \$3 00
la. 212,		to	25	**	**	3 65	3 85	4 00	4 50
(0, 215,	**	to	50	**	**	5 35	5 60	s 8o	6 60
lo. 216.		to	100	**		7 35	7 65	7 99	0 00
lo. 217.	"	to	250	**	**	11 50	12 00	12 30	14 00

SOCKET. 1 May 2, 1882. 10, 1883.

PATENTED DEVICES FOR WIRING AND PUTTING UP ELECTROLIERS, BRACKETS, ETC.

These Devices are unaufactured and sold under patents which are controlled exclusively by us, and the public are respectfully warned against all infringements of these or any of our Patented Devices. Our Devices are the only ones which comply with the requirements of the Bloard of Fire Underwriters and the rules and regulations hald down by the Engineering Department of the Edition Blentick Light Company.



No. 1100. Patented June 6 and Oct. 24, 1882.



Patented August 22, 1882.



Patented August 22, 1882.



No. 1105.
Patented June 6 and Oct. 24, 1882.



No. 1110

Patented June 6 and Oct. 24, 1882.



No. 1125, Patented June 6 and Oct. 24, 1882,



l'atented June 6 and Oct. 24, 1882.



These Devices are sold with our own fixtures, irrespective of the number of lights, at the prices in first column.

No. 1105, Insulating Open Yoke with Cut-out, sizes #xxf. 36x16, 36x36, 36x36.	For 1 or 2 Light Flature.	Par 3 Light Pixture.	For 4 1.Jght P	or Additional Lights. Per Light.
No. 1100, Nnn-insulating "	 Price \$2 00	\$2.65	\$3 30	\$0 6t
	" 1 50	2 15		
Also furnished to fasten to ceiling with screws or bolts instead of to pipe outlet - same price				
No. 1110, Insulating Brucket Union, sizes 14x14, 14x14, 14x14, 14x14,				
To. 1110; manning market Onton, sizes 1124, 1224, 1224, 1224,	 " 1 35	2 00	2 61	6-
No. 1115, "Electralier"		2 00		
No. 1125, Open Body for Wiring existing gas fixtures, sizes 1/x1/, 1/x1/, 1/x1/,	. 35		2 65	
		1 00	1 10	
No. 187, Electroller Celling Connecting Block.				
No. 187, Electroller Ceiling Connecting Block, Price \$1 25 - No. 185				Price \$1 co
No. 79, Open Ceiling Flange, sizes 1/2, 1/4, or 1/2 in.,				shed Brass, 35c.

Special Discount to Manufacturers.

No. 186 No. 965 No. 935 No. 945 No. 960 No. 930 No. 940

No. 186

STANDARD SAFETY CUT-OUTS AND PLUGS.

Patented May 2, 1882, and Sept. 12, 1882.

Canndinn Patent January 23, 1883.

















No. 1900.







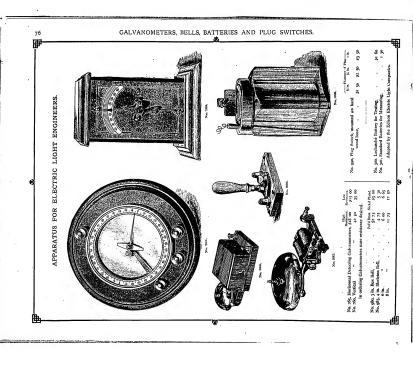


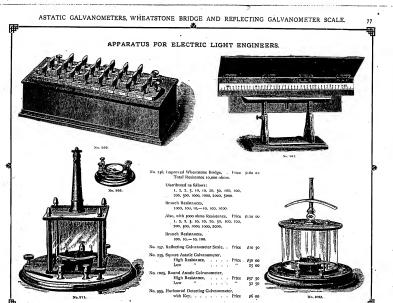
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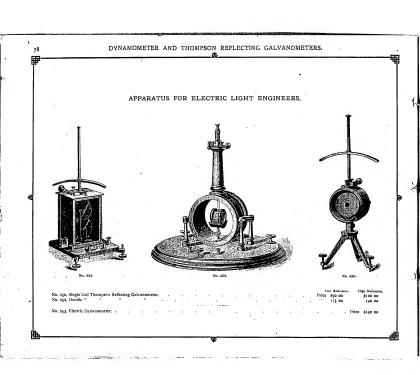
Price \$1 co d Brass, 35c.

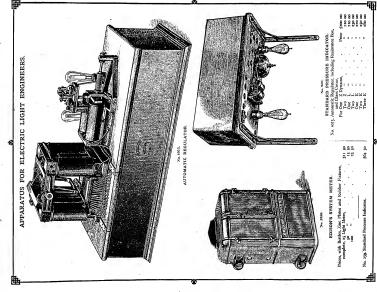
No. 184, Sing No. 186, No. 186½, No. 965, D'b No. 935, No. 945,	 Main Line Branch		" "	to to to	30 30 30	Lights	Mondding Clent Mondding Cleat Moulding	Work,		32 36 36 43 48 48
No. 945, No. 960,	 Main Line		No. 3.		100		atoutaing	**	1	20
No. 930, No. 040.	 Branch	::	10		100	"	Cleat	"_	1	20

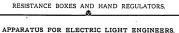
	Plain renatd. 30 10 32	Pol'd Brass. \$0 16 70	Gold Bronse. \$0 18 76	Nickel Pinted. \$0 25 1 00

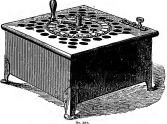














RESISTANCE BOXES AND HAND REGULATORS.

Nex. 276 and 481, Price \$18 00 \$35 00 \$38 00 \$10 00 \$50 00

In ordering Regulators state whether for A or B Lamps.

INDEX TO FIXTURES, ETC.

▶ This Index refers ONLY to Fixtures and Appliances manufactured by Messrs. Bergmann & Co.

ELECTROLIERS, PENDANTS, Etc.	Number 1992 1994 1995 1995 1995 1995 1995 1995 1995	655 Reflecting Shades
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25	Prices of extra lengthening.	"COMBINATION LIGHT" FIXTURES, ATTACH
20 4 20		MENTS FOR GAS FIXTURES, Etc.
	HALL LIGHTS.	
21 Ornamental # 20	HALL LIGHTS.	98 Plain 1-Light Attachment, 67
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	Ф.	

EDISON COMPANY FOR ISOLATED LIGHTING,
65 FIFTH AVENUE NEW YORK CITY

EDISON LAMP COMPANY,

EAST NEWARK, NEW JERSEY

EDISON MACHINE WORKS.

104 GOERCK STREET, NEW YORK CITY.

EDISON TUBE COMPANY,

65 WASHINGTON STREET, NEW YORK CITY

MESSRS. BERGMANN & Co..

MANUFACTURERS OF FIXTURES, &C., FOR THE EDISON LIGHT,
292 TO 298 AVENUE B, NEW YORK CITY.

EDISON COMPANY FOR ISOLATED LIGHTING.

REPORT

BOARD OF TRUSTEES

STOCKHOLDERS

ANNUAL MEETING,

NOVEMBER 18rm,

1884.

BOARD OF TRUSTEES

ELECTED NOVEMBER 20, 1883.

THOMAS A. EDISON, CHAS. H. COSTER, S. B. EATON, SPENCER TRASK,

E. H. JOHNSON, J. C. HENDERSON,
ANTHONY J. THOMAS.

EXECUTIVE COMMITTEE.

B. EATON, CHAS. H. COSTER,

E. H. JOHNSON,

.

OFFICERS.

S. B. EATON, President.

F. S. HASTINGS, Treasurer.

J. HUTCHINSON, Secretary.

GENERAL OFFICES:
65 Fifth Avenue, New York City.

Resigned, and E. H. Johnson elected President, October 14th, 1884

BOARD OF TRUSTEES

ELECTED NOVEMBER 18, 1884.

T. A. EDISON,

F. R. UPTON, A. J. THOMAS,

E. H. JOHNSON, SPENCER TRASK,

J. HOOD WRIGHT,

CHARLES BATCHELOR, C. H. COSTER,

THOMAS C. BUCK. F. S. SMITHERS,

EUGENE CROWELL

EXECUTIVE COMMITTEE.

E. H. JOHNSON, C. H. COSTER, F. R. UPTON, F. S. SMITHERS.

'OFFICERS.

E. H. JOHNSON, President and General Manager.

J. HUTCHINSON, Manager.

F. S. HASTINGS, Secretary and Treasurer,

GENERAL OFFICES:
65 Fifth Avenue, New York City.

To the Stockholders of

The Edison Co. for Isolated Lighting:

During the year ending November 1st, 1884, 143 isolated plants, aggregating 19,350 lights, have been installed, making a tosts, since the formation of your company, of 417 plants for 75,145 lights. These installations have been of almost every kind, as was explained in the last annual perpet, but during the present year less general depression of all manufacturing interests has seriously interfered with sales to factories, hereofore an important feature in your business.

In addition to permanent installations a profitable business has been done during the past year in renting plants to theatres, exhibitions, halls, &c.

The profits from lamp renewals have also been large, and they promise to increase from year to year.

Over two years ago a separate department was formed for conucting your buiness in New England. This department proved a source of heavy expense, exceeding \$18,000 in a year and one quanter, without producing adequate returns, but subjecting your company to very section losses from load debts and other causes. As your Board could not see any reason whatever for its continuance, it was formally disharded on July 114, 1884, and the New England business is now conducted with profit through your New York office.

During the present year your Company has been put to heavy expense for the purpose of taking part in several targe electrical exhibitions, especially in one recently held at Philadelphi. Vour Directors felt bound to see that the Edison light was properly represented, but they now believe that the system is so well known, and its metrits so generally recognified, that you can afford to hold

aloof from many of these exhibitions, which, in themselves, do not produce any corresponding benefit. You can refer to the Edison light, whether isolated, underground station or village plant, in actual operation, and your absence from these expensive exhibitions can not any longer be misunderstood.

A source of constant trouble in the financial management of your Company during the past year has been the heavy cash outlay incurred while each installation is in progress, and even after its completion, as payment is not made therefor until some time afterwards. The length of time which thus clapses is far greater than the eredit which your Company is allowed by the manufacturers of the machinery, &c., and for the labor of installing (a heavy item), cash must, of course, be paid. Furthermore, your Company is obliged to carry a large stock of unemployed goods, to have them on hand for installations as required. Consequently, it may be said that the larger the business done by your Company, the more difficult it becomes to make receipts take care of payments. Steps are in progress which, if successful, will correct this in part, but it is clear that your present paid-in capital is too small for your business, and it will be for your next Board to decide whether it may not be wiser to put the Company in easier circumstances by making a further call for some part of your unpaid stock,

In the spring of 18% angestiations were commenced between pure Board and that of the Edition Electric Light Company, boding to the transfer to you of the business of exploiting and installing earn station and village plants satisfie the limits of gas trentary. Such business artistic of those limits already belonged to you under your original contract with the parents Company. On the first day of September last, a contract was executed between the two companies (after radiations by their respective shareholders), by which you undertook such exploiting and installing within gas limits, on a basis of an equitation by their respective shareholders), by which you undertook such exploiting and installing within gas limits, on a basis of an equitation by their respective shareholders), by which you undertook such exploiting and installing within gas limits, on a middle particular relevance and middle particular of the payment of dividuated on the stock of your company.

stock, as is best explained by the following extract from the contract, as executed:

Exercise. Whereas the Light Co. how own fifty-mo machandrates it of might note of the instance Co., admit of the site content with the Indiana Co., admit of Juri 24th, 1885, is entitled to reache, without additional companies.

On, all the properties of all furnis because of and explait, which provides of the sale flagrenant, it is agreed, this entered does not in any way size or discussed in the sale of the sale flagrenant, and the sale of the sale flagrenant, and is agreed, the entered does not in any way size or discussed in the sale of the sale of

J. All net membeg of the hosterd Co., applicable to dividently, shall, leading the continuence of this agreement, be applied, flow, the project arthurst of, or dividend aggregating, not more than, eight per centum per annum on the saidt noted; second, to project a like dividency on like dividency, on the Light Co's, noted, aggregating not mere than eight per centum per annum; and, this, after the said desichous aggregating eight per centum per annum on both desich, after the said desichous aggregating eight per centum per annum on both desich, after the said desichous aggregating eight per centum per annum on both desichous aggregating eight per centum per annum on both desichous aggregating eight per centum per annum on both desichous aggregation of sold and admit the distributed among all light Co's note.

 As to the said dividends, each year shall stand by itself, and no deficiency in any one year, whether as to dividends on the each stock or on the Light Co's, stock, shall be carried over to another year.

During the past year your company has net with active competition from numerous infringen on the Edition patents, who, encouraged by the inaction by the Edition Ca, have become more and more embodemed, until many of them now exist as organized companies, working in opposition to year own. Your Bend is happy to say that the Light Co. is now taking active steps to proceed in patent in the country, and there seems to be every reason to hope that epochy and forecable decisions will be secured, thus justifying your dails to the possession of the only practical system of incinadacent

Your attention is invited to the balance sheet herewith, from which it will be seen that the net profits on business completed during the ten months ending November 1st, 1884, have been \$60,-248.62.

The great depression in business throughout the country has, however, affected some customers whose accounts were taken over from last year as good. As your Board has not thought it expedient to carry forward any sases of doubtful value, all these secounts have been written of for Profit and Loss, although some considerable portion of them will, in all probability, be eventually solicited. In the same way losses, which were not antispared on the 31th December have shown the same way losses, which were not antispared on the 31th December have shown been eshared off. The prevails in 1814 and these shared as the same shared of the prevails in 1814 and these shared off the prevails in 1814 and these shared off the same shared of the same shared off the same shared of the same shared o

or regular and satisfactory dividends.

The authorized capital stock of your company is the same as at the date of your last report, namely, \$1,000,000, made up as follows:

By order of the Board of Trustees, E. H. Johnson,

65 Fifth Avenue, New York, President

THE EDISON COMPANY FOR ISOLATED LIGHTING.

CONDENSED BALANCE SHEET. 8161.018 66 License from Edison Elec. Light 382,500 00 Co..... *382,500 0 \$744,438 66 Property accounts:

Rosdle plant....

Bijon Theatre plant (Hoston)....

Exhibition plants..... 93,179 86 8,776 75 15,096 02 68,090 69 56,722 05 Bills payable...... 35,225 01 91,947 06 Open accounts.

Profit and Loss account:

Profit and Loss account:

on surk completed between January 114, 1884, and Novamour Manager 1985, 1985, 1985, 1987 4.762 48 ...693,325 00 ... 1,537 59 ... 229 07 ... 8,627 59 ... 738 51 ... 14 54 ... 3,114 17 \$107,586 47 York, New England and 4.272 78 \$206,992 57 1,262 20 Edison Elec, Light Co. Sundry accounts...... \$28,470 56 21,742 08 50,212 64 Customers' acccounts for in-stallations, completed...... Bills receivable..... 163,485 75 7,320 71 5,219 03 26,679 70 Cash accounts.... Work in progress.... \$842,410 40 \$842,410 40

LIST OF EDISON ISOLATED PLANTS

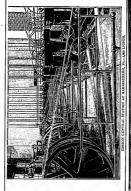
INSTALLED PRIOR TO OCTOBER 1ST, 1885,

IN THE UNITED STATES.

EDUCATIONAL INSTITUTIONS, PUBLIC ASYLUMS AND HOSPITALS.

NAME.	Aproxes.	NUMBER OF TAXABLE
Darwing College. Contest Plancy Long. Contest	Newport, I. N. Y. City, Patien, Mo. N. Y. City, Patien, Mo. N. Y. City, Patien, Mo. Righ, Ili, Raman, Raman	25 32, 300 300 300 300 180 078 320 50 078 320 250 250 200 200 200 200 200 200 200 2
HOTELS, APARTMENT HO	USES AND CLUB RO	оня.
Name.	Appenent	NUMBER OF LANTA
Apartment House, 51, 58, 50 Clark St		560 260 150

4,000 LIGHT STATION (EXCLUSIVE OF RESERVE).



THE HARRISBURG EDISON CENTRAL STATION IS A TYPICAL.

HOTELS, APARTMENT HOUSES, Etc.-Continued

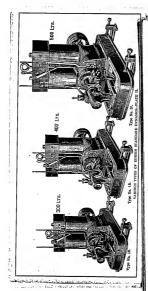
NAME	Atouss.	None Cor Lawre
Buckingham Hotel	N. Y. City Chicogo, Ili N. Y. City Brooklys, N. Y N. Y. City.	225 04 200 210 5,000
Franke's Apartment House	City N. Y. City	180 850
Hotel Royai Klasley's Restaurant Murray IIII Hotel Manitou Iros Spr'g Co.'s Hotel Mazzetti's Restaurant	Now Orleans, Ls Chicago, Ill N. Y. City Maniton, Col	820 525 050 101
New York Athletic Glib Osborno Apartment House Prospect House	N. Y. City	1,100 280 280
Remert's Hotel	Lake George, N. Y New Orleuns, La N. Y. City Welles Building, N.	800 400 150 130
The Powers Hotel		200

THEATRES AND PLACES OF PUBLIC AMUSEMENT.

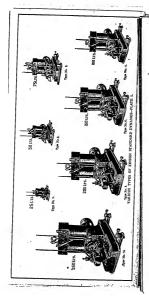
THEATRES AND PLACES OF PUBLIC AMUSEMENT.				
Name.	Antoniosa.	NEWROS OF LAMPS		
Academy of Mutic. Bigo Triestr. Ollego Opera House. Ollego Opera House. Ollego Opera House. Bare Music Marie Hall. Bare Music Hall. Bare Music Hall. Forthy Opera House. Grand Opera House. Forthy Opera House. Kouter & Balth Lycenum Theatire. Forthy Theatre. Movera Triestre. Moving Theatre. Moving Theatre. Moving Theatre. Forthy Theatre.	Descon, sines Guicage, III Beston, Mass N. Y. City St. Lonis, Mo. Philadelphia, P. Battimore, Mcl. St. Lonis, Mo. N. Y. City Guicage, III. N. Y. City N. Y. City N. Y. City St. Lonis, Mo.	108 250 425 000		

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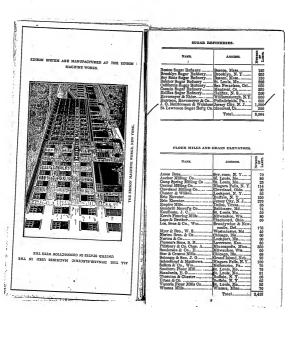


Miller & Co. Miller & Miller & Miller Miller & Co. Miller & Miller Miller Miller & Miller	NAME	Acontra.	NUMBER OF TAXABLE	
Albien & Osmono State Comment of the	r Building	N. Y. City	1,858	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	on & Co	. "	800	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	rienn Express Co		285	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	" " " ", ", ", ", ", ", ", ", ", ", ", ", "	Chlengo, llis	. 57	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	old, Coustable & Co	N. Y. City	100	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	ms Express Co	Dalabase Md	100	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	imore Staim Packet Co.	Caluatton Tores	00	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	nett, Capinin Joseph	Boston Mass	1,200	
Jackes misses and Co. Chet'hum Bueuch, llis Cluswer, C. S	ton Post Unico	Norfolk Vs	150	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	sit-Swill Electric Digino	Lako George, N. Y	100	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	charles & Sons	Boston, Mass	174	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	marolal National Bank.	Chlengo, Ills	108	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	orford & Bro	Middleton, N. Y	25	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	medman Office Building	. Chicago, Ills	250	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	coro City Hall		1,200	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	" La Salle St. Tunnel	" "	150	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	" Wash'gtonSt.Tunn	el '· '	125	
Jack de Minde Land Co. Chet them Bueels, Illis Cleaver, C. S	" Beard of TradoB'ld	g " "	850	
Cleaver, C. S. Shirt on Color of Co				
Cleaver, C. S. Shirt on Color of Co	ltenham Improvement C	o. Chelthom Benen, 1184.	250	
Deringforn, Bank & Og. — Phalledgrah, Ch. — Deringforn, Bank & Og. — Phalledgrah, Ch. — Dencal, I. W. and derise, Rick — Reg. — Dencal & Og. — Phalledgrah, R. — Dencal & Og. — Phalledgrah, R. — Parkelly & Og. — Phalledgrah, R. — Parkelly & Og. — Phalledgrah, R. — Parkelly & Dencal & Og. — Phalledgrah, R. — Og. — Phalledgrah, R. — Dencal & Og. — Phalledgrah, R. — Denca	ever. C. S	Silverton, Col	400	
December Meetre Light Co. Meetre M. C.	lington, Runk & Co	Philadelphia, Pa	150	
Dames, J. W. and others, Me. Deposit & Go. Philipolicipis, R. a. P	enport Electric Light C	Davenport, Iowa	100	
Bace C. C. Similarde Bills. T. C.	me, J. W. and others, Re	54 out . 111.	553	
Demen Budding N. Y. City Phylogloph & D. M. Chelogo, B. B. Phylogloph B. D. Phy	icnocs	Distributed by De	220	
Discont Motion Discon	xel & Co	Philadelphia, Fa	250	
First Salamus Bank. Cheege His. Problem Bank. Cheege His.	nean Bullding		144	
Fidelity Januarios Associati Sapubelphina, Pa. Grand Contral Displays C. Greinmant, Oshoo 11 Grand Contral Displays C. Greinmant, Oshoo 12 Grand Contral Displays C. Greinmant, Oshoo 12 Januarios C. Greinman	rbanks & Co	Chleago, Ills	251	
Gothan Maunfestering Go Y, City	Latter Turneyon Arrochet	- Philadeiphia, Pa	71	
Grand Control Depth. — Clerkmill, Oblo. — 15 Orand Cortan Depth. — Clerkmill, Oblo. — 15 Illanda, J. & Santa Anton X. Y. C. V. V. Illanda, Oblo. — 15 Illanda, J. & Santa Anton Depth. — 15 Illanda, J. W. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — Santa Anton Depth. — 15 Illanda, J. W. — 15 Ill	elity Insuranco Associat	N V City	27	
Grand Central Depot Aquies, N. Y. City Light Seed Confederation Stere 2 Affray 6 Qr., E. S. 3 Affray 6 Qr., E. S. 4 Affray 6 Qr., E.	and Control Depot	Cincinunti, Ohio	1.06	
Harder & Confectionery Steers 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	oul Central Denot Anne	x. N. Y. Clty	31	
Holle, J. S. L.,	vier's Confectionery Stor	C. " "	12	
Anthry & Co., 2. S	lin. J. S	"	. 5	
Lackson Disc. Lie Nover Cottledon, Mide. 3. V. City Committee Com	Tray & Co., E. S	" "	50	
Jopins Martin & Co. Section Miss. George M	kson Elec. Lt. & Power C	lo. Jackson, Mich	50 17	
Schmann, E. H	rdan, Mursh & Co	Boston, Mass	10	
Commard & Son	anson, E. II	N. Y. City	23	
Jaconia Bree, Light Oo. Heavens, A. to, con- Locky of Gar Co. Locky or, N. Y. Marke, Jac. H. Detroit, Mich. Marke, Jac. H. Detroit, Mich. Marke, Jac. H. Detroit, Mich. Marke, J. W. Marke, W. Mar	mnard & Son	St. Louis, Mo	20	
Ladd & Legista. San Francisco, Callagoria, Callagoria	conia Elec. Light Co	Laconia, N. 1	1 "0	
Lockport (das Loc. Lockport (das Loc. Lockport (das Loc. Lockport (das Loc. Lockport (das	dd & Logan	San Prancisco, Car.	55	
Marke, also, M. Marke, also, Delever, lilb.	ekport Gas Co	ILOCKHOOL, N. 1	1 16	
Merchan State M. Y. City Mandel, B. W. W. Olclego, Ills Mandel, B. City Mandel, M. Carolino, Mandel, B. City Mandel, B.	irkie, Jno. R Benk	Chicago Ille	1 16	
Mandal B. W. Daleago, Illa Mandal F. Held & Co.	Telling Mittonal Date.	N Y City	. 40	
Marshall, Fleid & Co Syncuse, N.Y.	andel D W	Obleage, Ills] 30	
McCarty & Sos, D. Syracuse, N. Y. McCarty & Sos, D. Detroit, Mich. Mills Building N. Y. City, Mills, M. D. Galego, Ilis. Mycra & Co., J. G. Albeny, N. Y. Milw. Exposition Asso, Fig. 3, Milwakee, Wis.	reball Field & Co		41	
Metcalf Bros. & Co. N. Y. City Mills Building N. Chicago, His. Mills, M. D. G. Chicago, His. Mycrs & Co., J. G. Albany, X. Milly, Exposition Asso. Bidg. Milwaxko, Wis.	Corty & Son D	Syracuse, N. Y	. 91	
Mills Building N. Y. City Mills, M. D. Claicago, Ills Mycra & Co., J. G. Albeny, N. Y. Milw, Exposition Asso, Pid'g, Milwaukce, Wis	tealf Bros. & Co	Detroit, Mich	. 17	
Mills, M. D. Chicogo, Ills. Mycra & Co., J. G. Albeny, N. Y. Milw. Exposition Asso. D'id'g. Milwaukco, Wis	ills Building	N. Y. City	. 00	
Mycrs & Co., J. G. Albeny, N. Y. Milw. Exposition Asso. B'id's, Milwaukco, Wis	He. M. D	Chicego, Ills	. 21	
Milw. Exposition Asso. B'id'g. Milwaukeo, Wis	vers & Co., J. G	Albeny, N. Y	. 20	
	iw, Exposition Asso. Bid	g. Milwaukeo, Wis	87	
135th Street Cable Road Budg, N. Y. City	5th Street Cable Road B'l	dg. N. Y. City	20	



BANKS,	OFFICE	BUILDINGS,	STORES,	EtcConfigued

BANKS, OFFICE BUILDINGS, STORES, Etc.—Continued.			
NAME	Accuses.	Norman OF LANT.	
Storn Bros Stagor, Gon, Anson (Residonco	N. Y. Olty	180	
oud others connected) Becond Avo. R.R. Car Stables Sponcer, Track & Co	Chleggo, Dis	440	
Second Avo. R.R. Car Stables	N. Y. City	812	
Sponeer, Trask & Co	Alteny	15 00	
Sponeer, Trask & Co. Tuylor, O. N. Tsounet, B. F. Thompson, O. O. Thompson, O. O. Thompson, Candoll & Leo. Thirmber, Whyland & Co. Van Antwerp, Bragg & Co. Ward, S. Western Edlison Light Co. Western Edlison Light Co. Wish	Ludington, Meli	00	
Thompson O O	Conton. Ohio	25	
Thomas, Craudall & Leo	Little Falls, N.Y	500	
Timrber, Whyland & Co	N. Y. City	830	
Van Antwerp, Bragg & Co	Batavlo	101	
Ward, B	Circiovillo, Unio	000	
White & Co. D. H.	Roston Mose	1.400	
Wilshire Building	Cloveland, Ohlo	450	
Yotes & Co., A. C	Philodelphia, Pa	250	
	Total	24,037	
NEWSPAPER AND OTH	R PRINTING OFFICE	rs.	
NAME.	. Appress.	NUMBER OF LAWR.	
Albony "Journol" Co Baitlmoro "Sun" " "American" Beal, Junius E. Boston "Dully Advertiser" " "Herakil" Offices. Chicago "Dully News" Co Clincinnati "Dully Inquirer". Claw & Richmond	Albany, N. Y	80	
Baitlmore " Sun"	Bultimore, Md	282	
"Amerlcm"		50 100	
Beal, Junius E	Boston Moss	182	
" "Herakl" Offices	17001011, 24127	000	
Chicago " Dally News" Co	Chlengo, Ills	183	
Cincinnati "Dully Inquirer".	Cincinnati, Ohio	200	
Clay & Richmond	Buffalo, N. Y	25 120	
"Courier" Company	Demonstration	120	
U Dally Prose & Kulokarlikar	Albony N. Y.	180	
"Detroit Free Press"	Detroit, Mich	100	
"Detroit Post& Tribeno"	" "	150	
"Gozetto" Printing Offices	Little Rock, Ark	200	
Government Printing Offices.	Washington, D. C	600 281	
tt Columnton Norm!	Delias Teves	100	
"Konsas City Times"	Kansas, Mo	200	
Lockport "Journal"	Lockport, N. Y	25	
"Now York Herald"	N. Y. City	700 450	
Now York "World"	Team N. V	70	
"Able State Tournal"	Columbus Oblo	00	
Clay & Richmond. "Gourier" Couppny. Devouppet "Gazetto" Gazetto" Devouppet "Gazetto" Gazetto" Trialing Oliocet "Globes Democrati" "Globes Democrati" "Gazetto News" "Kansas City Times" "Konsas City Times" "Now York "World" "Now York "World" "Now York "World" "Now York Heraid" Now York "World" "Forthin Badgock Telegrom "Philidelphia "Public Ledger "Philidelphia "Public Ledger "Philidelphia "Record"	Philadelphia, Pa	850	
Philadelphia "Prible Ledger Philadelphia "Record" Rond, McNally & Co Russell, Morgan & Co Syrocuso "Herald" "Troy Times " Union Printing & Pub. Co "Wellaw Resultani		550	
Rond, McNally & Co	Chicogo, flis	110 250	
Russell, Morgan & Co	Summers N V	230	
ts Troy Times "	Tmv. N.Y	51	
Union Printing & Pub. Co	Lockport, N. Y	95	
"Valley Bentinel"	Carlislo, Po	81	



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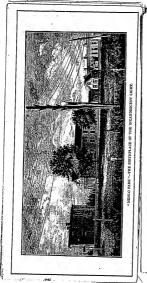


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HEADQUARTERS OF THE EDISON ELECTRIC LIGHT COMPANY, NEW YORK,

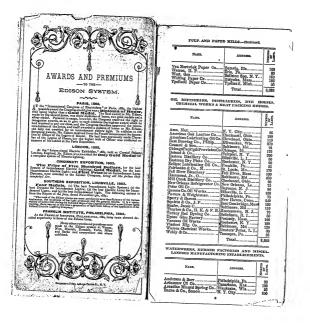
		<u> 4</u>
Arlington Mills Amer. Priat'g and Dyoing Co. Amory Mfg. Co. Alberton Cotton Mills Arnold Print Works Bates Manufacturing Co.		18
Aritugion Mills	Lowrence, alces	20
Amer. Print'g and Dyoing Co.	Monojuntor N II	80
Alberton Cotton Mills	Elvaville Md	27
Arnold Print Works	North Adems, Mass.	15
Rates Manufacturing Co	Lowlston, Mo	25
Bourne Millis Broad Brook Co. Carter, W. H. Connelent Mills.	Fall River, Mass	64
Broad Brook Co	Broad Brook, Conn	5
Carter, W. H	Lowell, Moss	8
Coanlest Mills	Fall Rivor, Mass	25
		12
· Clark & Koen	Philadolphia, Pa	25
Caucda Cotton Co	Cornwell, Conada	1,02
Continental Worsted Mills	Philadelphia, Pa	40
Cochrane, Jr., John	Malden, Mass	11
Columbian Mills	Southbridge, Mass	10
Davoi Milis	Fall River, Moss	85
Durimm Cotton Co	Durham, N. C	15 80
Eagle Cotton Mills	Madison, Ind	90
Enterpriso Mig. Co	Angusta, Go	5
Elwood, B. H. & E. B.,	Atlanta Co	88
Referencent Worsted Mills	Philadalphia Da	55
Contineated Mills. Cociarnes, Jr., John. Columbian Mills. Durlann Cottos Co. Engio Cotton Mills. Engio Cotton Mills. Engio Cotton Mills. Enterpriso Mfg. Co. Elwood, B. H. & E. E. Exposition Cotton Mills. Film Mills. Germania Mills. Germania Mills. Germania Mills. Germania Mills.	Full Bluor More	80
Germania Milia	Holyoko Mess	7
Givernaud Bros	Hackensnek, N. J	27
Givernand Bros	Hoboken, N. J	17
Givernand Bros	West Hobokon, N. J.	41
		00
Goff & Sons, D	Pawtucket, R. I	35
Gary & Soa, J. S. Grinnel Mg. Co. G. II. Gilbert Mg. Co. Goulding, G. K. Garner & Co. Hartford Carpet Co. Horrison. James. Hooper Twito and Met Co. Harder Kaltling Co. G. P. Ed. Bruco & Co. Josius. Pierco & Co.	Baltimore, Md	80
Grinnel Mfg. Co	New Bedford, Mass	82
G. H. Gilbert Mrg. Co	Ware, Mass	40
Goulding, G. K	Maiden, Mass	.2
Garner & Co	Wapp geraraus, N. 1	10
Hartford Carpet Co	Thomps avillo, Conn.	12
Torrison, Junes Met Co.	Nowolings, N. 1	30
Harder Kultting Co.	Hudean V V	10
G P Ido Bruso & Co	Tron N V	26
John P. Klug Mill Co.	Angueta Ga	70
Joshua Plerce & Co	Relatol Pa	15
King Philip Mills Laurel Lake Mills	Fall River Mass	70
Laurel Lako Mills	Fall River, Mass	40
Lockwood Co	Waterville, Me	81
Lorraine Woolen Co	Pawtucket, R. L	57
Merrimoek Mfg. Co	Lowell, Moss	25
Merrick Thread Co	Holyoko, Mass	76
Mt. Vernon Co	Baltimore, Md	40
Montreal Cotton Co	Valleyfleid, Ca	80
MeAden, R. Y	Lowell, N. C	80
Aleutora Carpet Co	Atatgon, Mass	20
Atmette Dinaio Cloth Co	atincito, N. Y	12
Montock Mar.	Paul River, Mass,	1 23
Madison Woolen Mills	Madless Ind	15
Noneutum Westeld Co	Newton Moss	11
Notional Mer Co	Nashvillo Tony	18
Noumkoog Mills	Solom Moss	1 20
Old Kontucky Weelen Mill.	Louisville Ky	85
Lawrel Lako Mills. Lockwood Co. Lorrakin Woolen Co. Lorrakin Woolen Co. Lorrakin Woolen Co. Lorrakin Woolen Co. Merick Transi Co. Mit. Vernon Co. Mentruck Transi Co. Mit. Vernon Co. Mentruck Cotton Co. Mentruck Cotton Co. Mentruck Mills. Minetto Blando Golit Co. Mostowk Mills. Montock Mills. Molitakin Mills. Molitakin Mills. Molitakin Mills. Montock Mills. Molitakin Mills. M	drogie, mo' with	

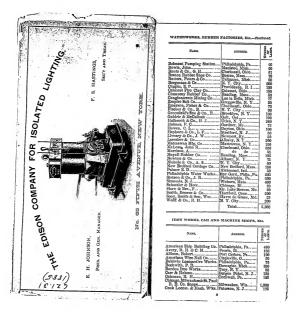


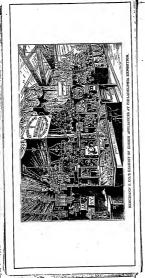
COTTON AND WOOLEN MILLS, Etc .-- Omi

NAME.	Accates	Numero
Pencedale Mfg. Ce Pemberten Milis Park Mount Cetten and Weel-	Lawrence, Mass	80
en Ce. (Ld.)	Lound Pa	1.3
Packacheag Mills	Puemlo, N. J	10
Rittenheuse Mfg. Ce Redman Mfg. Ce Riverside Wersted Mill	La Fayette, R. I	1
Riverside Cetton Mills	Dauville, Va	10
Reck Mfg. Co Seacounet Mill	Rockville, Cenn	1 (
Slater Cottos Co	Pawtucket, R. I	40
Sibley Mfg. Ce	Augusta, Ga Mechanicsville, Conn	90
Sayles & Washburn Stelulard & Sou, L Tayler, James	N. Y. City	10
Tingue, Heuse & Co Taylor, Wolfonden & Co	Gleuville, Coun	l ii
Taylor, Wolfonden & Co Wumsutta Mills	Cardiagtoa, Pa	70
Worambo Milis	Lisbou Falls, Mc	70
Willianntic Linea Co	Cardington, Pa	11
Wercester Corset Co York Mfg. Co	Worcuster, Mass	20 78
tork gug. Odaminini	Tetal	25,80

	NAME.	Anomess.	NUMBER
	Albion Paper Co	Holyoke, Mass	100
	Albany P. W. & W. Paper Co.	Albany, N. Y	8
	Cornwall Bros	Aun Arbor, Mich	2
	Chemleal Paper Co	Holyoke, Mass	15
	Eau Claire Palp & Paper Co.	Ean Cinire, Wis	2
	Full Mountalu Paper Co	Bellows Falls, Vt	65
	Frambach Paner Co	Kankauna, Wis	- 6
			2
	Hill, Rewland F	Ningara Fulls, N. Y.,	. 2
	HudsonRiverPaper & PulpCo Howland & Co	,	20
	Howland & Co	Sandy Hill, N. Y	10
	Herklmer Paper Co	Herklmer, N. Y	- 5
	Janoway & Curpender	New Brunswick, N.J.	82
	Kalamazoo Paper Co	Kalamazeo, Mich	. 8
	Keeney, A. W	Rockford, Ill	. 2
	Lockport Paper Co	Lockport, N. Y	. 0
	Nlxou & Ce. W. II	Philiadelphia, Pa	
•	Newman, Warner & Elfelt	Minuespolls, Minn	. 0
	Ohlo Paper Ce	Mics, Mich	8 0 0 0 8
	PennsylvaniaPulp & PaperCe	Lock Haven, Pa	. 8
	Pettibene Paper Ce	Ningara Palls, N. Y	. 2
	Pertage Straw Beard Ce	New Pertage, Ohlo	10
	Quigley, John F Regers, H. J	Niagara Fails, N. Y	. 2
١.	Regers, 11. J.,	Appleten, Wis	. 80
١	Susquelianna WaterPowerCo.	Cenewinge, Md	- 5







THON WORKS OAD & WAGHING SHOUL PIA ... Continued

NAME.	Azoness.	NO.
Jenden Mig. On. Jenden Mig. On. Jenden Mig. On. Jenden Gewing Mochine Oc. Mcleus Gewing Mochine Oc. Mcleus Gewing Mochine Oc. Mcleus Gewing Mochine Oc. Mcleus Herrich Gewing Mochine Oc. Mcleus Herrich Gewing McCorniel Mochine Co. Mcleus Herrich Gewing McCorniel Mochine Oc. Mcleus Herrich Gewing McCorniel	Cineage, 11s. N. Kolyt Pa. M. M. M. M. M. M. M	25 06

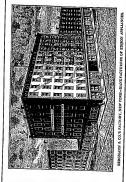
FURNITURE AND PIANOFORTE MANUFACTORIES AND WOOD-WORKING ESTABLISHMENTS.

Name.	Appears.	NUMBER
Anson, Bidred & Son Anson-Bidred Luma & Mg Co. Anson-Bidred Luma & Mg Co. Beatty, D. F. Boyes, James Bridgeport Organ Co. Bridgeport Organ Co. Dolgo, Alfred Hayward Bros. & Co. Knabe & Co., Van. Lyward Bros. & Co. Mcnasha Wooden Waro Co. Musson, Edgata. Cowego Mig. Co. Cowego Mig. Co. Robert Robert Co. Robert	Fort Howard, Wis. Wannan, Wis. Washington, N. J. Munele, Ind. Bridgeport, Conn. Ashburnhan, Mass. Dolgorille, N. Y. Garther, Mass. Balthnore, Md. Clinton, Ohlo. Little Palls, N. Y. Williamsport, Pa. Oswego, N. Y. Sheboygan Riehmond, Va.	7. 0 0 25 40 80 15 13 15 6 14 5 16 20 20 10
Sociales A: Co		01

Total.....

CENTRAL STATION APPRATUS CONTROLLING AND OPERATING DEVICES, ELECTROLIERS AND FIXURES OF ALL DESCRIPTIONS.

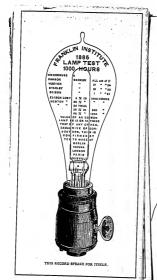
prompt policy commission in the executive



 STEAMSHIPS, STEAMERS, YACHTS, &c.

NAME OF VESSEL	OWNERS	NUCLUS OF LANCES.
"Cetumbia"	O. R. ond N. Codo de	120
"Queen of Pacine".	go de	250
"Olymplan"	de de	450
# Alarkian P	de do	280
" Kolomo "	do do	275
		00
" Alamedo "	do do do	250 250
"Kloan"	do do	120
"Virginia"	Boltlmore Steem Pocket Co.	180
"Carolino"	do d	185
"City of Worcester"	Norwich Line	542
"Albatross"	U. S. Fish Commission U. S. Government	150
"Trenton"	U. S. Government	240
"Dolphin"	do da	179
"Mississippl"	do da	65
"New Hompshire".	do Navol Training Ship	280
"Namonno"	Jomes Gordon Bonnett	120
"Atalanta "	Jay Gould	130
"Nourmohal"	U. S. Gevernmeet. de d	184
"Electra "	Elbridge T. Gerry	120
"Fra Diavoto"	E. S. Stokes	25
" Pulgrim "	Fall River Lioe	020
" Bristol "	Old Colony Line	675
H IV E Mishes II	do do	075
Wate Adams II	Elbridge T. Gerry. E. S. Slokes. Fall River Lioe. Old Colony Line. do do Jeffersoné. Evnany. Sivonbyl.Co. Mem., Ark. & Bendalyacket (O.) Jeffersoné. Evnany. Sivonbyl.Co. Jeffersoné. Evnany. Sivonbyl.Co. Illinois Central R. R. Co. Detroit Dry Dock (C. C.) Detroit Dry Dock (C. C.)	41
Renton McMillion II	Leffarran & Dendar Texet Co.	120
" Oshorne"	Illinois Central B D Co	87 55
"Mascatte"	Detroit Dry Dock Co	50
		05
Fanwood " Plainfield " Commanipow "	do do	05
"Plainfield "	do do	65
"Communinow"	do do	65
		05
"D. S. Miller "	Poughkeepsle Transfer O	54
'Hasbrook "	do	50
F. P. James"	Albany & Troy S. S. Co	82
* Algoma "		100
	do do	100
Athabasko "	Old Domiolon S. S. Co	100
Old Domiolon"	Old Domiolon S. S. Co	180
Wyaooko"		15
		15
Poppoke !!	do do	15
Louise !	Polehantan Otamahanta Circum	15
Drow "	Populate Floors Albania	48 75
Dean Richmood ".	do do	75
Joppo"	Isryland Steamahin Co	03
Boltimore"	Balt., Chos. & Rich. S. S. Co	50
	m-1-1	
	Total 6	3,002
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The Steomer "Columbia" heading this list was the first vessel ever-lighted by the incandescent electric light, which also was the first commercial plant lostsiled.



RECAPITULATION.

on on the grand and with a sign to have been propositive for a first from the control of the con

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		NUMBER	Numera
And Hotol Tireat Banks Nova Sugar Flour Cotto: Prip Che Water cell Iron Trumi	atlenal Institutions, Public Anylum Hospilahi. Hospilahi. Hospilahi. A Ayartanca Houses and Chib Rouni re- sa hil pitese of Ammesonet. A Manuscanet. Hospilahi. Hospi	20 20 21 74 84 11 00 83 80 28 41 41 18 51	9,077 18,100 ,14,281 24,092 0,061 5,054 25,390 8,388 3,802 5,038 7,067 3,882 8,002
	* Total	520	182,870

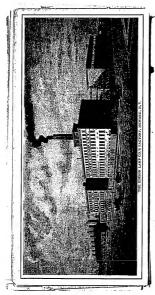
* All these, it should be borne in mind, are owned and operate by the purchasers themselves.

CENTRAL STATION LIGHTING.

The central lighting stations, operated by Edison companies and dovoted wholly to the work of supplying lights to the general public precisely riter the manner of gas, are as follows:

NAME OF CITY OR TOWN.	STATE.	NOMBER CO LANTO.
Midletown. Williamsport. Piqua Nowburgh (underground) Tiffin Fall River. Hazleton Lawroseo (underground).	Pennsylvania. Ohio Pennsylvania. Ohio Now York. Ohio Massachusetts. Pennsylvania. Massachusetts.	18,000 1,200 700 4,500 1,200 8,000 1,200 8,000 1,200 4,500
Shamokin Broekton (underground). Circlevillo. Cumberland Des Moines Appleton Harrisburg Westchetter Johnstown Tumaqun	Massachusetts	8,000 3,000 1,200 1,200 3,200 2,000 5,000 2,000 1,200 2,000
t.	12	,

12



MANUE OF CITY OR TOWN.	STATE.	NUMBER 00 LAMES
IoKeesport Now Brunswick Josepo Josepo Villasington Sow Beaford Jorilin (naderground) Jilan Jilan	Iowa Delaware Massaciusetts Germany Italy Total	1,000 2,000 2,000 14,000 8,000

This makes a grand total of \$21,178, or, if the lemps notually placed in isolated plants were taken instead of merely the dyname capacity, in grand total of upward of 300,000 Edison imags in metual mag.

PLANTS CONTRACTED FOR TO LIGHT EXHIBITIONS DURING THE YEARS 1884-5, IN THE UNITED STATES.

Place.	LAMPR
onisville, Ky. St. Lonis, Mc. (permanent). New Orleans, Inscinnant, Onio Joston, Mass. Illiwaukeo, Wh. Philadelphia, Ps. (exhibit).	3,600 5,000 1,200 1,200

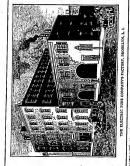
DIAGRAM SHOWING YEARLY INCREASE OF THE EDISON INCANDESCENT LIGHT IN ISGLATED PLANTS IN THE UNITED STATES.

- NUMBER OF LAMPS, 1885

13

IN SUCCESSFUL OPERATION IN NEW YORK, NEWFORGHL N. V.

IN SUCCESSFUL OPERATION IN NEW YORK; NEWBURCH, N. Y.;
LAWRENCE, MASS, BROCKTON, MASS; FALL RIVER,
MASS; SANTLAGO, CHILL; MILAN, ITALY,
LONDON, ENG.; AMSTERDAM, ETC.



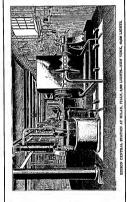
PRINCIPAL EDISON INSTALLATIONS IN EUROPE.

produced and sign and recovering the endpotent for each extent of president and recovering a significant and a security of the contract.

			_
EXOLAND.			
Broland. Wright, Turner & Son Nather & Son Nonelty & Sons, D Hoboy & Co Threstre Noyal. Helborn Restaurent. House of Commons	Safford Safford Manchester Manchester Manchester Monden Westminster	Spinners Engineers India Rubber Engineers Ricstaurans Dining-rooms & Libry	1,000 1,000 1,000 1,000 1,000 1,000
PHANOE.			
Point Prires et Noreux. Ggern Grand. Credit Fonder, Ougne-Vetti. Maison Haschette. Li Loefiel et U* Drouber-Venter.		lianque Magnains Ateliers de liciture Musée Diorans Exposit, de Tablenux	2,000 2,000 400 400 500 500 1,000 400 400 400
GERMANY.	1		
Theatre Royal	Nunich Strasbourg	Thentro	2,500 2,500 2,500 800
	1	1	
Austria. Stadt Theatre Böhm. Nutlonal Theatre Union-Haugesetischett. Fr. Redlich	Brilan Prog Brila	Theatre. Cofé. Thusage.	1,000 8,150 140 560
ITALY.		vacatre	2.890
Municipio di Milano Societa del Teatre Man 2008. Cotonoficio Ventzinivo. Signori Leguani, Marini		Holel Continental	817 572 475
SPAIN.	1	1	
Gouvernement	La Carraca Carthagena Madrid	Usino.	150 150 44
BELIEUM.	1		000
Philipps Glazers Alme Babola	Ruyabroek Ternomba Saint-Vallio	Convertures Colon Metiers à Tulle	114 50
Russia.	1		800
Finlayson et Ch L. Knopp. Ch Josefow	Temmerion Moscou Josefow	Fliature Fliature Sucrerio	100 100 100
MISCULLANGOUS.	i		1
WesterStekerraffinsder Spakter et Tetteredo. Palais du Hol Theatre. Station Centrale	Steekholm. Buchnest. Amsterdam	rainis Tacatro Station Centrale	145 160 1,500 1,000
	1	Total	. 02,878
		<u>'</u>	-

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MACHINES EVER BUILT ARE IN USE, HAVING A CAPACITY OF 1,000 LIGHTS EACH.



IN THE NEW YORK, MILAN AND LONDON EDISON CENTRAL STATIOUS THE LANGEST DYNAMO-ELECTRIC

Edison Electric Illuminating Company of Brockton

This folder contains printed material issued by the Edison Electric Illuminating Company of Brockton. This company was organized in February 1833 by William Lloyd Garrison, 7. The plant commenced operation on October I of that year. It was the first underground application of Edison's three-wire distribution system.

The following item has been filmed: "Description of Edison Electric Light Plant, of Brockton, Mass." (1885).

Had Electre Rept - Carpet Stal Gred to: 1225-03-04

DESCRIPTION

Edison Electric Light

BROCKTON, MASS.

W.J. Sonks

(PHINN ELECTRICAL REVIEWS)

Incandescent Electric Lighting;

WITH STREAL REPERENCE TO AND

DESCRIPTION

OF THE

EDISON ELECTRIC LIGHTING STATION

OF

BROCKTON, MASS.

EDITOR OF THE ELECTRICAL REVIEW:

no distributed and anticipation of the second state of the second

The world is beginning to realize that the problem of producing light by dectric agency, for so many years producing light by dectric agency, for so many years and are sufficiently as the producing so deterated in a solution that the public is not only to be generally interested in the improved illumination by the new methods, but will soon be offered a share it the namagement of mmerous local enterprises, and the jecuniary advantage, which is now shown to be only a question of a short hard which is now shown to be only a question of a short hard

The fact is perimen not generally supremised that two per cont. of the earlier live empitted the country is invested in the business of Illusination, a larger proportion than is represented by any other inlustry that that of transported the contract of t

LIGHTING BY INCANDESCENCE

he comparatively untrodules. In all the United States of Jones systems are in operation where the distribution of other for any stems are in operation where the distribution of other in order to the state of the s

BROCKTON, MASS.

Here the Edison, as yet the only system of central station lighting by low tension currents, was offered to the public Oct. 1, 1883. As might reasonably be expected, some grave mistakes were made in the general policy first instrument.

For instance, in a manufacturing city where land (as near the centre of trade as the station of an incandescent night should be) is valuable, and room with nower is always at a premium, a building should always be so constructed that the second floor and those above may be readily reated. The extra cost of an additional story or two is insignificant as compared with the advantage secured during the early years of the enterprise. In Brockton a second floor, favorably located for a shoe factory, and the size of the original Edison station, 50x65 feet, rents for \$300 to \$500 per year, and power for \$75 to \$100 per H. P. The Edison building was however devoted only to the illuminating business, while the station of the Thomson-Houston company, 60x80 feet, since erected, has paid a good income on its entire cost by the rental of two floors with about ten horse-power, at apwards of \$2000 per year.

Inexperience in the

MECHANICAL DETAILS

of installation resulted in faulty construction, especially in the vital matter of laying the underground conductors, and a reliable service was secured during the first six months in the face of electrical complications growing out of these errors, which have not been repeated in later systems, and need never be encountered in future.

The sectional boilers first installed have proved less economical and satisfactory than a tubular boiler added last summer. Some reasons for this result will be noted later on.

CONTRACTOR CONTRACTOR

An exhaust injector, amplying water from the street unaise to the injector against a steam pressure of 100 pounds, at a fewperature of 100 to 100 was used for the first at k mouths. In internitiont sation, accessitating constant waterinisms, proved a decided drawback to its underhiness where the duties of engineer, dynamic and regulator steendard and forman, diverded upon one unn. The use of the Nutsian beater, which was finely secured, The use of the Nutsian beater, which was finely secured to the contraction of the nutsian security of the nutsian security of the nutsian security of the nutsian security of the security of the nutsian security of the nutsian security of the nutsian security of the nutsian security of the security of the nutsian secur

The attempt to me short belts obliged them to be run so tight that extra oil, of higher cost than would otherwise have been necessary, was demanded, and even then the loss of power was shown by a degree of heat at the bearings of the armatares, calling for a constant application of water, and necompanied, in the case of a heavy load, by a notable pulsation of the lights.

A SMALL INITIAL BUSINESS

The wheels were started with a small number of lamps connected, least hum one-quarter of the quota required to pay expenses, and at a time of year when the long house of winter lighting whea a meter system should show its best work, were so close at hand as to pass before this best work, were so close at hand as to pass before the junda was secured, thus obliging in eletermised effort to increase mpidly the patronage in order to prevent the entry year's record from being unfarorable and discouraging the patronage of the part of

ing.

Castomers were expected, from the first, to bear the entire cost of wiring their residences and places of business, purchasing the earlier and more expensive styles of electrolics, or adapting their gas or other fixtures to the new light, even before the test of time had convinced the public of its reliability and adaptation to their necessities or convenience.

The Himminating Company attempted to do their own WIRING OF BUILDINGS.

and found themselves in the position which a gas company would occupy if endeavoring to carry on both the husiness of manufacturing gas and that of piping. To the exploiting of a rapidly growing industry, demanding all their lest efforts, was added the cure of a large stock of supplies and patented devices, and the necessity of meeting a demand for a special class of mechanics. It is not strange that in this department mistakes were made which have since been corrected at considerable cost. The result was the forming of a semarate organization, to take the business of inside wiring entirely into their hands, latterly known as the New England Wiring Company. Acting in harmony with the Illuminating management this necessory body did good work in convassing the field, seenring customers in all directions, placing some of the most elaborate fixtures, and showing the most varied and attractive applications of the Edison system in Brockton's stores and residences, which are to be found in any American city. Finally, with increased experience in the intriente and often perplexing detail of the work, the Wiring Company extended its field from the strictly local basis on which it started, and within the past year has done varied service in Pravidence, Attleboro, Andover, Manchester and Boston for isolated plants, and at Laconia, N. H., for the uncleus of a central station system. Thus, as an outgrowth of disadvantageous circumstances, spring an auxiliary which has proved a most valuable aid to the progress of the enterprise, and whose experience may be made available in future systems.

All the disadvantages here only hinted at combined to present so severe a test of the real money-making consisting so system that special force attackes to the fact that the legitlante running expenses of the attack of or the year onling September 30, 1884, together with some extraordinary outlays not likely to become necessary

in future, were paid by the income, and that the returns for the five mouths since that date indicate that a dividend will be carned the present year.

Redictional distriction of the second section of the second section of the second section sect

It will be readily understood that this result could not have been secured without intelligent and fuithful manuscement of the central station machinery, persistent efforts for the extension of the system and the increase of the number of customers, and watchfulness of the needs and preferences of all connected with the wires, and of the conditions which hasare reliability of the service. Nor must the fact be overlooked that the business eaterprise which always creates enthusiasm among Brockton merelmuts over the introduction of "a good thing," played no small part in the instantaneous success and rapid adoption of the new light. The experience now gathered, and applied the pust winter to the operation of the system, will doubtless be fruitful of regularly gratifying results in future, and offer substantial encouragement to those debating the development of similar plants. A few other

SCRAPS OF HISTORY

and experience will perhaps be valuable to inquirers.

Number of 10-eandle Lamps at starting station, 200

"connected Oct. 1, 1884, 2000

Population of Brockton, Jan. 1, 1885 (about) 20,000

Price of 10-candle Edison Lamp (equivalent to average

5-foot gas burner) 1 cent per hour. Cost of Power, (about) 860 per H. P., for the first year of 865 days of 10 hours.

CAPITAL AND EXPENSES

estimated for a 1600-light underground plant (corresponding with perhaps 3000 lamps actually installed) in a town or small city with fairly compact business district. Capital, covering franchises for central station and

isolated lighting, complete installation of plant with single set of machinery, and eash \$5,000 for construction and other outhrys daving first year after starting station, \$53,000

Average Running Monthly Expenses of plant, when 2500 10-candle Lamps are installed, and 1000 in actual average use, say four hours every day (oughes running from dark to day-

| light) :— Coal, 3 parts acreenings, (suy \$3.25 per net ton,) and one part Camberland, (say \$4.75,) using Jarvis furnace, \$200.00 Ol and Waste, 17.00

Water, 125,000 gallons, any twenty cents per 25,00 claums, 1000 gallons, 1000 gallons,

Mouthly Total, . . . \$815.00
Gross Income, 4000 Lamp Hours per Day, . \$1200.00
Not Profit per year on this mouthly average,

84% on capital stock.

The aliver estimates, though based upon the experience of the Brockton plant, do not in several respects agree with the results there seemed. They rather indicate what should be and what may be attained, under or-

dimary of communications, if proper provision for reasonable economy is made in construction of the station.

networks and great ministration of the sales of a policy and a contract of the sales of the sale

THE ELECTRICAL MACHINERY

of the Brockton station has, in the main, proved so satisfactory as to leave little to be desired which in the present stage of scientific progress it seems possible to supply. Very recently some modifications of the 150 light dynamos have brought their capacity fairly up to 400 maperes and 125 volts, thus enabling them to provide for the loss of about 15 per cent. in feeders, mains, and inside wiring of buildings, and still maintain 800 10-candle Lamps requiring 110 volts to develop their normal light. The fact that this result is obtained while reducing the speed from 1200 to 900 revolutions per minute is one of the most gratifying recently brought out. This makes it possible to use 58-inch driving pulleys on the engine (in place of 66-inch) at 250 revolutions, and 16-inch on the dynamo (instead of 14-inch), and while retaining as available the normal power of the engine, and all the sensitiveness of its centrifugal governor, secure the maximum work of the dynamo with less heating of the bearings, less oil, and less wear of the commutator and brushes.

It has been objected to the methods of the Elitone central aktions that no automatic regulation is provided. Without doubt this will be secored, but those wide ordicate regues to foreign that a composal wiseling, without property of the composal size of the com

The delicate Edison indicator shows the watchful engineer a variation of 1 per cent. In the number of lamps in use, and in the case of a large theatre whose lights may aggregate from 25 to 50 per cent. of the entiro load on the system, it has been found convenient to use a special wire connecting a small signal beload key on the stage with a mechanical going at the station end, and canding either party by a code of signals, to ascertain at any moment the circumstances of the other, and give warning of sudden changes.

The occurrey of the Kilsion meter system has been the subject of much doubt. Its pureful operation has the subject of much doubt. The pureful operation has even been put upon the level of the incorrigible gauger of evaluated highwigen. Without question it is an oney to make an electric netter lie as a gas neater, but it is certain-rate estatement of one largered. Note that the statement of the contract of their electric light communition, unding a dully note of the lamp-hears, and in some cases bying aside money for the payment of the billia. Such have uniformly been gratified in the necessary of the meter record, from the contraction of the contract to the billia. Such have uniformly been gratified in the necessary of the meter record, from the contract to the contract to the such as an advantage of the contract to the contract to the such as an advantage of the contract to the contract to the such as an advantage of the contract to the contra

The City Theatre, opened in October last, was the first in this country to be lighted by incandescent lamps by current from a central station metered like gas. The 500 lights distributed over the stage, auditorium, corridors, dressing rooms and approaches, form the only method of illumination, and as a matter of additional presention, current is received from two services, drawing from the mains at points widely separated. In a smaller theatro since fitted, and in two large skating-rinks, wellgrounded confidence has entirely excluded other methods of general lighting. The satisfaction realized as to quality and quantity is emphasized by the fact that after months of service by meter, the rinks have contracted with the Edison company for the season on mutually agreeable terms. The managers of the larger theatre, where the use of the light is intermittent, manifest no disposition to End fault with the meter bills.

The observed could lious uncessary for a perfect, thus system have been so closely men, and the vorce of munifacture is now so curriculty curried out, that in a year and a last for stemia service so instance of trouble within a service so instance of trouble within uncessaring the service so instance of trouble within mechanical work of laying these studies and subsequent at telement of services will effectually prevent unsatisfactory working.

THE STEAM PLANT.

It would be difficult to limb an engine better admited to the exactions of central station work than the Armington & Sims automatic ent-off, with the latest improvements, including relief valves, preventing the possibility of necideat from water in the cylinder. With fairly even pressare of stems, the regularity of its action under the sudden elanges of load which constantly occur, is surprising, and when its full power is brought out in a case of short-circuiting of the main conductors, when in the twinkling of an eye its burden may be multiplied perhaps ten-fold, perlmps twenty-fold, its performance excites admiration and constitutes one of the safeguards of the system, enalding the dynamos to melt out the obstruction and contime their work. The high-speed engine, belted direct to the dynamo, may justly be regarded as one of the corner stones of the sneessful electric light station of the fu-

The upid growth of the system made is advisable last spring to reinforce the fig \(\)1 to diagram eming 550 recolutions, and the 14\frac{1}{2} \tau, speeded to 295 to 295, by a seconial mediate of the latter star, with its accompanying crease of the loiler empody of the station last summer. After careful conditionation this was exceptibated by the plesing of a 125-11.7, steel tolarier loiler by the Jerviz Engineering Company. This convex was pursued because of the following undercorder points developed by the Sec which were the summer.

- Slow action in raising stemm. The tubular now in use shows 80 pounds (from cold water) from twenty minutes to imif an hour sooner than the sectional.
- 2. Difficulty in recovering pressure when started downward by a sudden increase of load. This probably results from the extremely limited stem room, and small holy of water exposed to the fire. Where, as in electric lighting, it is suicidul to stop the wheels during a run, this point becomes a vital one, capically when one man is charged with a variety of duties.
- 3. Uncertainty us to the level of the water. It has often happened that after opening the gauge-cocks, the water falls to reuppear for some time, and leaves the fireman in suspense us to the real state of the case. The steam is also less dry and of course less effective than in tubular bolicary.
- 4. Amount of cure necessary. The frequent eleaning of the outside of the tubes by steam jet almost be supplemented by periodical Inspection of their interior, a task which, as the plugs which close them speedily rasted in, has become practically impossible in this station between the hours of shutting down in the morning and starting again toward night.
- 6. Greator economy of tabular form with Jarvis boiler setting. The tosts made elsewhere, on which this Judgment was based, were supplemented in December last, by a very careful trial here, of which the following figures give the

O	COMPARATIVE RESULTS.	RATI	ΛE	REST	ILTS			Ī	Steel Tubular Beller and	Balenck & Wilcox Refers
Date of Tests,								[Dec. 3, '84, Dec. 5, '84,	Dec. 5, '8
Duration of Tests,			•	٠				Ī	16 h. 7 m.	16 b. 5 m.
Grate Surface,							Š	Sq. Ft.	36	
Kind of Fuel used,			٠				٠.		I year fielt Coal,	ě
Average Steam Pressure	ore,		•	.•	٠	٠	•	lbs.	85.16	87.22
Average Temperature of Feed Water,	of Feed W	ater.	•	•			•	G.	. 209.16	208.38
Pounds of Buel gonning .		200 lbs. wood figured	rood fig	nued)	Screenings,	ngs,	٠	lbs.	2,250	
There are a second	nda	equal 100 lbs. soft coal.	bs. sof	t conl.	Soft Coal,	· i	•	Ilbs.	850	3,800
Pounds of Ashes and Refuse	Refuse,	٠		٠.			•		900	285
Pounds of Combustible,				٠	•				2.700	3.315
Per Cent. of Ashes and Refuse,	d Refuse,		•				•		15.9	10
Pounds Water Evaporated under Actual Conditions,	ated under	Actua	Condi	tions.	٠		•		35.458	37.001
Equivalent Evaporation from and at 212°	n from and	at 212		٠			•		33,724	38.521
Pounds Water Evapor.	ated per po	and of	Coalm	ider Agt	and Con	ditions,		٠,	10.47	6
Pounds Water Evaporated per pound of Coal from and at 2120	ated per po	Jo pund	Coal fr	on and	at 212°				10.88	10.01
Pounds Water Evaporated per pound of Combustible Actual Conditions	nted per po	Jo pun	Combu	stible A	chml C	ouditions			19.02	10.53
Pounds Water Evaporated per pound of Combustible from and at 212º,	ated per po	and of	Combin	stible fr	om and	at 2120,	٠		12.40	10.96
Cost of Fuel consumed,	ned,						٠		86 85	88.56
Pounds Water Evaporated @ 212° for \$1.00 worth of Fuel,	ated @ 212	Sig.	1.00 w	orth of	Fuel,		٠		5,765	4,500
Economy shown by use of Tubular Bollers, Jarvis Furnace and Screening Mixture.	e of Tubul	ar Bolle	n, Jar	rls Purn	ace and	Screenia	ng Mis	ture.	22%	
II. P. developed by indication of Armington & Sims	y indication	a of At	mingto	n & Sim	8 9	5 o'clock,	P. M.		96 H. P.	94 H. P.
engines at comparative times.	times.				9	:	:		· 96	102
					۰.	:	:	_	36	95
From 9 P. M. until 7 A. M. the power varied, being	11 7 A. M.	the pov	rer vari	led, being	8	3			101	112
at times as low as 10 H. P.	w as 10 H.	e;			6	;	•		: 101	128
Canton of Continues									. 000	

2240 lbs.

Soft Coal, \$5.05 per Sereenings, 3.50 per

.Cost of Corl, {

The central station system shows in practice all the advantages of isolated plants with one or two important additional features. The steadless of the light should in most cases be far superior, while the presence of duplicate boiler, engine, and dynamo power, guards against the liability of interruption which exists in isolated installa-

The Dilisen light is found to be ulmost equal to the ure in its power of distribution in color and texture of goods. There are several libeckion merchants who are from that they have no healthin in matching, by the ordinary light in their stores, all but the most deficate of shedos, and these are shown with great distinctions by the mean of several lumps, or by a single hump of high purece, no arranged on the counter nuder an opaque shade as to caust for full reliminary sport the goods does at hand.

Brookfor shows some mergeness of switches in some residence lighting, the nursh and beautiful effects in residence lighting, the nursh greatest of switches in some instances controlling all the most from one or two central points, for gen some first from one or two central points, for gen contents in most of fire or midnight visitations. Proclimating monolight of frees are produced by placing image on rerandes, where the light will stream through open windows in the warm creatings of summy.

In a central engine bones enerly forly inney, in sleeping rooms and over seamors, we combinedity lighted in grooms and over seamors, we combinedity lighted the first stroke of an slarm, the same necknisal mostel, the first stroke of an slarm, the same necknisal mostel in the first stroke of an slarm, the same stroke of the trained stones at the poles of the engine. One chern's has been filled with cilmother the engine. One chern's has been filled with cilmother in the balls, risks and theatree the three-wire system in the balls, risks and theatree the three-wire system of the stroke of the stroke

HINTS TO PROMOTERS.

It may not be out of place in closing this ulready long

communication, to suggest a few points of importance to syndicates or individuals thinking of starting stations this year.

1. The choice between the coveriend and nategorousd plans abouth to determined by the relaining of the specially pass abouth to determined by the relaining of the special regarding heavy pole lines in or user the principle special three or server the existence of present finar or rows of trees, the feasibility of placing poles on private hand along the rear lines of street obtains and the propagative size of the apstrate. Very few cities can be subspiritely served by overload systems. Honoverload without the properties of the policy street, and the propagative size of the apstract way the properties of the propagation. The coverbed conductors, if it adapted to the place, will cost from one-quarter to one-third as sunch as the underground.

 If you contemplate an underground system, come to Brockton if possible, and study the results where present knowledge has been gained largely by home experience.
 If an overhead installation is to be preferred, visit the plants in Pennsylvania or Ohio.

3. If an experienced numager is notarvailable, senur-during construction and the early nomin to ver oof opposition, the best precision through the state of precision, the best precision knowledge of the three-write system which money will farmisk. Don't under the ministic of attention, and the state of a stempting to est running expenses the first year by nating most of questionable ability. No verification calculations of the state of the notices, and the lumps, are of premount importance.

the moters, and the haups, are of paramount importance to the early reliability of the service, and its lasting reputation. When numbers of good men have become familiar with the system, it will be time to elsoon between them. Get the best while the first few months' service is monthly service in the control of the service is monthly public option.

4. If possible, combine the are and innundecent systems under one management und one roof. One

steam plant and one force of men can care for both, and

no better training for the handling of the dangerons high tension currents can be found than that which tension currents can be found than that which tenders the proper care of low tension concluders. If there is somey to be made in electric lighting, it is to be found in a system where an are lamp like the Thompson-Houston lights the attreet, and the Edison glows from the show-wholows, while the same trees nakes tenum for both, or the same while the same trees make steam for both, or the same

the control of the co

6. Don't fillow the saying to pass before your plane for this year are well onlined and in processor fearenther. The American espitalist, unlike his more moderate Eagler for this year are well of the fill and the said of the

W. J. JENKS.

BROCKTON, Mass., Murch 24, 1885.

Edison Electric Illuminating Company of New York

This folder contains printed material issued by the Edison Electric Illuminating Company of New York. Organized in December 1880 to build generating stations in New York City, this company constructed the Pearl Street central station, which began operation September 4, 1882.

The following Item has been filmed: "Annual Report" (1884).

41209

EDISON ELECTRIC ILLUMINATING COMPANY OF NEW YORK.

REPORT

BOARD OF TRUSTEES

STOCKHOLDERS

ANNUAL MEETING,

DECEMBER 970,

1884.

BOARD OF TRUSTEES

WHOSE TERM HAS RECENTLY EXPIRED.

EUGENE CROWELL, THOMAS A. EDISON,
S. B. EATON, C. T. CHRISTENSEN,

C. II. COSTER, F. S. HASTENGS,
SPENCER TRASK, G. P. LOWREY,
J. F. NAVARRO, J. HOOD WRIGHT,

E. WIMAN, F. R. UPTON,

HENRY VILLARD.

OFFICERS.

S. B. EATON, Vice-President.

F. S. HASTINGS, Secretary and Treasurer.

C. E. CHINNOCK, Superintendent of Station.

GENERAL OFFICES:
65 Fifth Avenue, New York City.

OFFICE OF FIRST DISTRICT STATION: 257 Pearl Street, New York City.

BOARD OF TRUSTEES

Appendiculation of the second second

ELECTED DECEMBER 0, 1884.

E. D. ADAMS, CHARLES BATCHELOR,

EUGENE CROWELL, C. H. COSTER,
R. L. CUTTING, JR., C. E. CHINNOCK,

T. A. EDISON, E. IL JOHNSON, F. S. SMITHERS, SPENCER TRASK.

J. HOOD WRIGHT, E. WIMAN

E. WIMAN, F. R. UPTON.

OFFICERS.

SPENCER TRASK, President.

F. S. IfASTINGS, Secretary and Treasurer.

C. E. CHINNOCK, Superintendent of Station,

OENERAL OFFICES:

65 Fifth Avenue, New York City,

Office of First District Station:

257 Pearl Street, New York City,

To the Stockholders of

The Edison Electric Illuminating Company of New York City:

Your company has now completed the fourth year of its existence, and your Board feel that the results achieved are a fair cause for congratulation as to the past, and for encouragement as to the future.

Vour enterprise was one of peculiar boldness. Starting almost from the moment that Mr. Edison had demonstrated the scientifie rescess of his great invention, you undertook to apply practically, and to its fillest extent, a system which had scarcely been tried at all, except in the laboratory, and whelps, for its authorground and excent astation was concerned, existed only theoretically. When the construction of the present exential station was commenced, there were in use, perhaps, a half doesn small, imperfect isolated plants; and with only three toguide you, you meterook and have carried to selentifie and financial success the great problem of underground central station lighting by electricity in competition with gas.

At the date of the last annual report, the First Detrict had sciredy more than reached the point where its exceptive sure in except or the penses. During each and every month of the present year they have shown a handsome inverse as compared with last year, and instead of a loss as in #88, the operations of #88, will have a surplus of fully 3g per cent. on the capital stock, after paying expenses of every kind.

The following table shows in detail the average number of customers and of lamps connected, the collections, operating and general expenses (including all repairs and renewals), taxes, &c., and the profit or loss for gach quarter of the years 1883 and 1884. It will be remembered that, prior to February 1st, 1883, the light was supplied as an experiment. free of cost to consumers,

Month.	Average of citolomers connected.	Average of Jumps connected.	Collections	Operating and general expenses.	Lees,	Profe.
1883. February	199	4-324	\$1,168 64			
March	35"	4-374	\$3,766 64	\$9,904 48	\$6,115 24	
Nay	273	5-931	8,yes 69	14,052 18	CC cops,29	
July	430	E/683	15,689 eq	15,297 31		fep 70
October	483	10,172	14,700 11	17,623 cå		7,207 e3
stt4. January					118	
February	498	10,685	18,650 34	18,009 88		10,429 46
April	541	11,594	13,400 54	18.248 97		7,951 57
July August September	șta	- 19,503	23,849 34	19.025 EB		3/73 46

The financial results of the foregoing table are summarized in th following:

	1883		181	34.
February and March	86,115 84	loss.*	810,429 46	profit.
April, May and June	6,040 39	**	7,251 57	**
July, August and September	491 70	profit,	3,873 46	**
October, November and Decem- ber	7,207 03 84,457 50		14,000 00	"†
Net profit, 1884			935,554 49	

FThe profits for December are estimated at.

The school profits for October and November were. Making the estimated total for the quarter, as above....

As a matter of course, the profits of the station fall off considerably in the summer months, as will be seen from an examination of the foregoing tables. To neutralize this falling off in part, your Company has undertaken to furnish electric motor fans to be run by current from the central station, and while their introduction last summer was not possible until too late to secure any considerable results, the fans met with such favor as to warrant the belief that next summer they can be developed into an appreciable and permanent source of revenue.

A heavy item in the operating expenses of the First District has heretofore been that of lamp renewals. Owing to imperfect electrical determinations in the construction of the District, and the consequent inequality of electrical pressure, the lamp breakage was unduly heavy. It is very gratifying to state that during the past summer these defects of construction have been mostly corrected, and improvements have also

The average monthly life of lamps during the past year, as reported by the Superintendent of the Station, has been as follows:

January	400	hours	of use.
February	523	**	"
March			"
April	448		"
May	400	,"	**
lunc	380	**	
July	502	**	
August	553	٠.,	**
September	727	**	**
October	730		
November	914	**	**

The following additions have been made to Construction Account of the First District since January 1st, 1884:

New plant, including 2 engines 150 H. P. each 1 2 dynamos, 1 lights each 12 regulators, and expenses of installing same.		03
Station apparatus		oī.
Street conductors, viz.: 3,8497 foet		
House connections and original lamps		41
Meters		31
Tools and implements	22 (68
Motors		
Office fectures	···· 59 2	33
Total	\$58,001 1	16

The expediency of these expenditures, which have only been made after careful deliberation, is best shown in the financial results achieved, which are due in a considerable degree to the fact, that the increased expense of running the station as enlarged, bears but a small proportion to the increase of receipts secured by the enlargement. The station is even now taxed to its utmost capacity, and it is evident that further additions to the existing plant could be made with substantial advantage to the company. In fact, the Superintendent of the Station reports that there are now on file over one hundred applications for the light, of which at least fifty, requiring about 750 lamps, would furnish very desirable customers.

Notwithstanding the recent reduction of the price of gas from \$2.25 to \$1.75, per 1000 cubic feet, our First District station has not yet lost a single estiment, which is the best possible proof that our fight, at its present cost (one and one-fifth cents per hour of use for lamps of 16 candile power), is found more desirable and satisfactory than gas even at the reduced into the proof of the price of the proof of the price of the

Of even greater importance, however, thus the enlargement of the First District, is the question of starting a district up town. When your company was organized, it was believed that its authorized capital would be sufficient to install both an up-town and a down-town district work the delays and difficulties encountered with the down-town district were so great, that the capital proved insufficient to install it alone, and even now your company finds itself in dotts to the Light Co. for more than \$970,000 for money advanced and balance of license, though against this your company fash itself in dotts to the Light Co. for more than \$970,000 for money advanced and balance of license, though against this your company claims extrain offsets afrising from the in-creased cost of the First District. In face, the down-town district has been operated in the face of every possible disadvantage, but your Board has believed that it was pursuing the right policy in showing what could be done under all these unfoverable circumstances, hoping thereby to shorten the time when it could enlist the necessary capital for work up-town.

The present district, which is bounded by Wall street, Broad sirreet, Reshange Place, Brandway, Sprone treet, and the East Kreet, is perhaps the least remunerative in, the city, being occupied mainty by boaking and other offices, which are closed on an average earlier and six o'dood, so that the hours of light consumption are very short. A far inher field for your enterprise would be an up-lowed district, sectualing perhaps from Twenty-bridt street to the Central Park, and

from the Eighth to Madison avenues. Not only would the hours of light consumption be much longer, but owing to the great cheapening now made in the cost of everything connected with the Edison system, the cash capital required entirely to install and equip a station of light giving capacity equal to the present one (and situated somewhere within the limits indicated), would be, as appears from preliminary estimates already made, not over one-half the amount spent for the down-town station. It is estimated that during the coming year this latter will earn fully five per cent. on its stock, or equal, in other words, to ten per cent, on the cost at which it could now be duplicated. In an un-town station, where there would be longer hours of light consumption, it seems very reasonable to assume that half again as much profit, or at least fifteen per cent, net per annum at the start, could be carned; and were it not for the general depression at present affecting all electric light investments, embracing both the good and the bad, your Trustees would not hesitate to come before you at once with some scheme to raise the capital for a large up-town installation. In all probability, considerably more than fifteen per cent. could be earned in an up-town district, but even on this basis it is felt that with the results already achieved in the First District, the time is near when a successful plan can be formulated for an up-town station, and as soon as one large station is started up-town there can be no doubt that the extension of the system throughout the entire City of New York will follow,

Your present capital stock is the same as at the date of the last report, viz., \$1,000,000, made up as follows:

Unpaid Subscriptions	
	1,000,000

The attention of shareholders is invited to the balance sheet herewith, which exhibits the condition of the company on October 31, 1884. As the fiscal year of the company ends on the 31st December, it is recommended that the time for the annual meetings in future be changed to the third Tuesday in January, when the actual results of each previous twelve months can be presented in their entirety, without the necessity for partial estimates which at present exists.

> By order of the Board of Trustees, S. B. Eaton, Vice-President.

DR.

EDISON ELECTRIC ILLUMINATING

CONDENSED BALANCE SHEET,

License under Edison Patents..... \$350,000 00 Construction Account, First District: Red Katete \$66,375 66 34,249 50 128,623 05 New Plant..... " New Plant 34,125 03
Street Cambustors 236,259 13 House Lamps and Original Connections...... 20,552 03 Meters..... 2,439 00 3,107 22 Office Familiare and Fixtures..... 1,417 21 Engineering Account..... 19,241 99 Experimental Account.... 89,552 57 Buildings Wired..... 49,142 47 11,165 84 American Steam Heating Co...... 1,307 41 724384 75 Construction Account, Up-town Districts: 25,705 64 Open and Property Accounts: Lighting Apparatus 65 Fifth Ave...98,771 20 Less written off for depreciation, &c. 4,000 00 4,771 20 2,762 18 Moulds and Patterns..... 136 50 Supplies at Pearl Street Station..... 18,372 32 Sundry Accounts 5,681 87 31,724 07 \$1,131,814 46

Company of New York.

OCTOBER 11ST. 1884.

CR.

Capital Stock Paid in S987,010 oo Accounts Payable 11,749 71
Bills Payable 10,139 00
Mortgage on Pearl Street Buildings 30,000 00
Edison Co. for Isolated Lighting
Edison Electric Light Co 59,460 74
do, do. Special (Balance of License). 15,039 34
Profit and Loss
Less written off from cost of Lighting appa-
ratus at 65 Fifth Avenue 4,000 00
17,306 17
/
. /
. /
E & O. E. S1,131,814 49

New York, Oct. 31st, 1884.

F. S. HASTINGS,

Treasurer.

Western Edison Light Company

This folder contains printed material issued by the Western Edison Light Company of Chicago, Illinois. Organized in May 1832, this company oversaw the installation of electric lighting plants in Chicago and throughout the Midwest.

The following Item has been filmed: "First Bulletin" (1882).



FIRST BULLETIN. Western Edison Light Company, SECRETARY'S OFFICE.

No. 51 & 53 WABASH AVENUE.

CHICAGO, September 12, 1882.

For the information of our Stockholders, I submit herewith a list of isolated contracts closed by the Western Edison Light Company since its organization:

NAME.	LOCATION.	Size or	
Culmmet Club HouseC	hicago	65 A I	amps.
Academy of Music		125 "	
C. W. & E. Pardridge & Co		310 "	
Norton Flouring Mill		15 "	
*Western Edison Light Co		250 "	**
C. D. Seeberger		60 *	**
N. K. Fairbank		105 "	
I. W. Doane			
O. R. Keith		****	
Edson Keith			
Marshall Field			
II. J. Rogers	Appleton, Wis	250 **	
A. E. Martin		145	:
O. N. Taylor	Ludington, Mich	15 A	46
Gazette Co	Davenport, In	120 B	es.

HOUSES WIRED READY FOR INSTALLATION

OF PLANT.	
NAME.	Location
J. R. Jones	Chlengo
T. R. Dent	"
Jas. Sears	"
11. 11. Porter	*
There seems to be very flattering prospects for a	
ness this fall and winter in the isolated lighting de	partment of

Everyone now using the light is thoroughly satisfied with its

operation, and no doubt several of the above parties will increase their plant,

NEW YORK COMPANY'S PLANTS.

As very few parties are aware of the rapid adoption of the Edison Light, I include herewith a list of some of the principal parties who are using this light in the United States.

Considering the short time the Edison Light has been in the field as a competitor for the electric lighting business of the country, its progress has been phenomenal in the face of the numerous are lights in the field.

9 1	ARATION	NAME.	Stee or th	
			A. Lamps, II.	Langes
Albany, N	. Y	. Spencer, Trask & Co	15	
		Weed, Parsons & Co		120
Augusta, C	ja	Sibley Mfg. Co	400	
Blue Mon	itain Lake, N. Y	Prospect House		250
Brackett's	Bridge	Alfred Dolge		126
Bergeo Po	int, N. J	& Hobson		120
Brooklyn,	N. Y	, Brooklyn Sugar Refine	ry 75	
Baltimore,	Md	Steamer "Carolina,"	100 (10 ci	undfe.)
Boston, Ma	186	Hotel Vendome	60	60
		Boston Herafd	250 (10.5	milto)

		. Lamps, H. Lamps
Cornell, PaR	II. Coleman	(0
Cluciunati, O		
	III Creek Distillery	
E. Moorestown, N. J		
E. Boston, MassII		
E. Cambridge, MassJ.	P. Squires & Co	., 130
Fullerton, Pa	icKee & Fuller	120
Fall River, Mass	all River Blenchery	45 40
" "B	orden Block	125 12
" "K	ing Philip Mill	705
	nurae Mill	
	nerel Lake Mill	. 350
	onauticut "	
Glenville, ConnT		
Hudson, N. YK		
Holyoke, Mass		
	ermania Milis	
	Alting Paper Co. Mill.,	
Jersey City, N. J		
Kingston, N. Y		
Lowell, MassM		
Lishen Falls, Mc W		
Lawrence, Mass,		
	rlington, 66	
McKcesport, Pa , N		
Newark, N. J		
Newburgh, N. Y Ja		
" "Ja		
New Bedford, Mass W		
	" No. 6	
New Haven, ConnSj		
New York, N. YR		
" "R	roódence J. H. Wright	125

	on a rioza.	Name.	SIZE OF PLANT,
Now York	V V	Α.	Lomps, B. Long
"		Prof. Draper, Laboratory	- 15
		Mux. Am	. 60
		Atkinson & Co., Store	. 60
		Hinds, Ketcham & Co., P'ro	- 24
	** ***	Aitken, Son & Co., Store	. 36 3
		St'm-hip City of Worcester	. 60 12
	*****	Nathun & Dryfus	. 12
	*	Maninttan R'y Car Shops,	. 12
	*	J. G. Beanett, Herald Buikl'g	5.9
**		· · · · Yacht Namounn	
	"	E. S. Juffrey & Co	110
		II. K. & F. B.Thurber & Co.	2tn
**		· · · · American Bank Note Co.	
Oregoa Rail	way & Nav. Co	S. Ship "Columbia."	120
*	" "	··· " "Queen of Pacific.".	244
	** #*	Portland Docks	
Pawtucket, 1	3. I	Slater Cotton Co	110
Passaic, N. J		Rittenhouse Mar Co.	
Paterson, N.	J	Dunforth & Cooke, Loc. Wks.	6-
	*** *******	W. Straograf Co. Sitt. Mill.	
Philadelphia,	Pa	Philadelphia Record	105
		Public Ledger	250
** *		J. B. Stetson & Co., Hat M'y.	120
		Baldwin Loco, Works	120
Rochester, N	Y	Eastman Dry Plate Co	75
San Francisco	o, Cal	ILS. Crocker & Co., Store.	15
Saylesville, R	. I	Lormine Woolen Mill	00
Stillwater, M.	inn	Seymour, Sabiu & Co	
St. Johnsburg	. Vt	Pairbuaks & Co	250
Treaton, N. J.		Treaton Iron Works	00
Urbana, O	*************	U. S. Rolling Stock Co	DO .
Washington, 1	D. C	Record Raom, Gt.P'tg Office, t.	125
		N. J. Bentty, Organ Manf	25
Waterville, M.		Lockwood Co	250

		***************************************	A. Lamps, H. L.	
Winous, Minn		Winona Mill Co	70	
Winsted, Conn		N. E. Pin Co. Silk Mill.	250 (10 car	dic.)
		Willimantle Linen Ca		,
The following plan pany for Isolated Lig		ave been installed by the	se Edison C	om-
		nchine Works, Chlenga		130
Rand, McNally & Co. C	hlea	£0,		120
Marshall, Field & Co.,	**		60	
Palmer House,	**		60	
Joo. V. Farwell,	44		120	
U. S. Rolling Stock Co.,	**	(Shops)	125	
STARTING OF		E FIRST CENTRAL :	DISTRICT,	
The Central Station	n in	New York City was s	tarted Sept.	5th

The Central Station in New York City was started Sept. 5th with perfect success.

One-third of the district has been lighted up, and about 5,500 lamps are in successful operation.

The balance of the district will be completed as rapidly as possible.

possing.

This will hasten the closing of contracts for franchises for Central Station lighting in this Company's territory; several cities already being under negotiation at the present writing.

There are now upwards of 20,000 Edison lights in operation in the United States, and an equal number in foreign countries. These bulletins will be issued from time to time, as matters of interest to our stockholders may make it uccessary, in order to keep them informed of our progress.

D. H. LOUDERBACK, Secretary, THE PHEST DISTRICT BEILLIANT WITH THE INCANDESCENT LAME - THE ISSUATED SYSTEM IS IN SPECIESFFU, OPERATION.

In stores and business places throughout the lower quarter of the city there was a strange glow last night. The illin flicker of gas, often subdued and debilitated by grint and uncleanly globes, was supplanted by a steady glare, bright and mellow, which illuminated interiors and show through windows fixed and unwavering. From the outer darkness these points of light looked like drops of thme suspended from the jets and rendy to fall at every moment. Many scurrying by in the prencentation of the moment falled to see them, but the attention of those who chanced to glance that way was at once arrested. It was the glowing incande-cent lamps of Edison, used last evening for the first time in the practical illumination of the first of the districts buto which the city had been divided. The lighting, which this time was loss an experiment than the regular imagoration of the work, was eminently satisfactory. Albeit there had been doubters at home and abroad who showed a disposition to scoll at the work of the Wizard of Menlo Park and insignate that the practical application of his invention would fall far short of what was expected of it, the test was fairly stood, and the hunhorseshoes did their work well. For a long time the company have been at work preparing for the lighting of the district. But there were obstacle to them which occasioned worrying slelays. The insertion of meters had first to be attended to, and then come the inspection by the Board of Fire Underwriters. As there was but one competent expert encharged with this work, it naturally lagged, and it is still being pressed forward in places where the lighting apparatus is not yet ready. Then there were difficulties to be encountered in the laying of the wires and the establishment of connections So, many people shook their heads at failure of the promised radiance, and believed something was amiss. The company went on matiringly, however, and last night it was fairly demonstrated that the Edison light had a very fair degree of success

THE LAMPS ABLOW.

It was early is the evening that the current was first transmitted over the wires and the earlson horse-thous became aglow. The machinery worked well from the start, and the marked difference of the electric and gas

well from the start, and the marked difference of the clearly worked well from the start, and the marked difference of the clearly and great the start and the marked difference of the clearly and great the start and the start

-for the store, the counting-house, the workskop and for domestic uses, they came to appreciate how well the mellow yellowish light performed its functions. When the Illumination was begun Mr. Edison stood in the wwkshop of the central office of the First District, at No. 257 Pearl street, in his shirtsleeves, superintending the work. Through the muchinery the men flitted about as husy as bies. Messengers came speeding in to say all was ready, and then the complicated apparatus was set going, and in a twinkling the area bounded by Sprince, Wall, Nassau and Pearl streets, where the incandescent loups had been introduced, was in a glow. There had been scientists who claimed the lighting of such a state by such a method an hipposibility. But the result proved the continuery. Edison was vindiented and his light triumphed. Over the lighted area were blg hulldings like the Drexel and little stores tacked away in durk corners, but the communi-cation nowhere failed, and the practicability of the analysis are method was attested. All the lights in this space were not started last evening. In some places only a few of the number in rendiness for lighting were wanted, but about three thousand were aglow, and if everything goes well, over five thousand illuminators will soon be in readiness for use. Among the larger buildings in this section where the light was used are the Drexel Building, Times Building, Polhennes', Barnes', Greene Sons, Washburne & Moore's

Actions on FILE Inter.

Act the creating prospeced the nation of the light was carinedly satisfied by those who had it chose to them. But it move becomes its strongth, and the flori sight disc limitation, never her you distingness, we since signify the first the light and the company's entire exemple perfectly satisfied, and extra the limitation accepts the second perfectly satisfied, and exemple and the limitation of the

The other method of introducing the incumbercent limit has also been directived. In some of the Indiality advant term wither an incumes uniform flights are used, the Eddon Company for lookind lighting lawer to the property of the company of the lawer of law

duced in the American Bank Note Company Building, in Thurber's, E. S Jaffray's, Everett's Hotel, Aitkinson's and Ams'. If the light is made of thorough avail, it is proposed, too, where great power is required, to introdu electric motors instead of steam

[New York Tribroic, September 5.]

ELECTRICITY INSTEAD OF GAS.

Many persons in the throng that pours down Fulton street every evening on the way to Brooklyn had their attention attracted yesterday to the lights in several of the stores on both sides of the street. In the place of the usual gas lixtures, were those of the Edison Electric Illuminating Company, each bump shedding its light from a small blazing horse shoe that glowed within a pear-shaped globe, pendeat beneath a porcelain shade. The company at 3 p. m., turned on the electric light in part of the first of the districts in which this kind of illumination is to be distributed, from a common centre. The first district is hounded by Nassem street, the East River, Wall street and Spruce street, Ferry street and Peek slip. The central station which supplies the electricity for the lumps in the different stores and offices is at No. 257 Pearl street, just below Fulton street. At this place hist evening only two of the large engines of the six that are in the second story were in use. The services of the others will not be whally needed, even when the entire district is lighted up.

At this station Mr. Edison, his chief engineer, Edward H. Johnson, a the other employes were found in a high state of give at the opening of the electric-lighting system. Mr. Edison said: "We started our machinery this afternoon, and are now prepared to supply my light permanently to the district. The buildings of our customers have been inspected by the Board of Fire Underwriters, and as fast as the inspections are completed, the lights are put in. For the last two or three weeks the company has been long testing its system of underground conductors, making connections with the buildings of its subscribers, and putting in fixtures and meters. Statements have been published recently from some electricians, to the effect that my system was interly impracticulate. We have proved to-day, already, that it is a success. The lights in the office of Drexel, Morgan & Co., half a mile ny from the central stations, are harning as brightly as the lights here."

Mr. Johnson said: "We have the electric current flowing from Pearl street to Nassan street, and from Wall street to Sprace street. But actually we have only about one third of the district lighted up to-night. There are eighteen miles of pipe laid and hetween 3,000 and 5,000 lumps are supplied. We have 16,000 lamps wired. In this district there are about 1,500 gas company subscribers. Out of that number we have secured 1,100 as sub This station how is only half completed. When finished, and if we seem

the patronage of all the present users of gas, the station will supply the nowe for 22,000 lamps. The principal concerns that we have lighted up to alght, are Drexel, Morgan & Co., who have 100 lamps; Window, Laulet & Co., tween 50 and 60 lumps; The Ansunia Brass and Corner Co., 100 lumps; Washhuru, Moen & Co., 50 lamps; and numerous other smaller firms and places in Fulton, Pine, Wall, Nassau, Beekuma and William streets, and Maiden Lane. There are no lamps lighted in Pearl street. Where we have not run the connecting wires into stores and uffices, we have been prevented by the excavating work of a steam-heating company. Connections will be made as rapidly as possible, and it will not be many days before the lights have been furnished to the whole district. On Saturday we united all the feeding pipes that run from our station with our underground street system. Each of our machines here has a capacity five times greater than that of any similar machine ever before made. We will not need all of them to furnish the power for this district, and if one breaks down we shall be able to call in the power of the others that will not generally be in use, as a reserve. Conatly there will be no interruption in the supply of light to our customers. Where the electric lights were in use last night the subscribers of the Edison Company expressed themselves as gratified with their brief experience with the new illuminating agent. The light was soft and perfectly stendy, and appeared to distribute itself more evenly and uniformly than the light from gas-burners. The decrease in the heat caused by it, as compared ith gas, was gratefully appreciated by the clerks who had to work hencath it.

(Extract from N. V. Times, Sent. 5.) RDISON'S REPORDED LIGHT

"THE TIMES" BUILDING BLUMINATED BY BLECTRICITY. Edison's central station, at No. 237 Pearl street, was yesterday one of the busiest places down down, and Mr. Edison was by far the busiest man in the station. The giant dynamos were started up at 3 o'clock in the afternoon, and, according to Mr. Edison, they will go on forever unless stopped by an earthquake. One-third of the lower district was lighted up, the territory being within the boundaries of Nussan and Pearl streets and Spruce and Wall streets. During the past few weeks the Edison Electric Illusoinating Company has been cagaged in completing the installations in the premises of its customers by the insertion of meters and lamps, and in procuring inspection of such premises by the Fire Underwriters. As the Board of Underwriters has but one expert, Mr. Oshorne, the progress has been neces surily slow, but such portion as has been inspected was supplied last night. Mr. Edison said that the work will be pushed as rapidly as possible, so that the rest of the district-that lying between Pepri street and the East River and Spruce and Wall streets, will soon be lighted. The laying of the steam-

Yesterday for the first time The Times Building was illuminated by electricity. Mr. Edison had at inst perfected his incambs cent light, had put his machinery in order, and had started up his engines, and last evening his company lighted up about one-third of the lower City District in which The Times Building streds. The light came in in sections. First there came in a series of holes in the flours and walls, then several miles of protected wires, then a transparent little egg-shaped glass globs, and, last of nli, the fixtures and ground glass shades that made everything complete. They were temporary fixtures to give the light a trial, and so were put in with as little tearing and entting as possible. To each of the gas fixtures in the establishment a brouse arm was attached, and the electric lamps were suspended from the ends of these arms. The lump is simplicity itself. At the top is a brase circle, from which are suspended the shade and the lamp proper. The latter is a glass globe about four inches long, and the shape of a dropping tear, hoad at the hottom, narrow in the neek, in which is inclosed the carbon horseshoe that gives the light. The globe is air-tight, and the nir lins been exhausted, leaving the carbon horseshoe in a perfect vacuum. When the thumbserew is turned, and the connection with the electric wires is thus formed, the electric current makes this earbon so brilliant that it would be implessant to look at. It is not intended to be looked at however, being entirely hidden by the ground glass shade. The whole lamp looks so much like a gas-burner surmounted by a shade that nine people out of ten would not have known the rooms were lighted by electricity, except that the light was more brilliant than gas and a humbred times steadier. To turn on the light nothing is required but to turn the thumbscrew; no matches are needed, no patent appliances. As snon as it is dark enough to need artificial light, you turn the thumbserew and the light is there, with no nauscous smell, no flicker and no glare.

It was about 5 o'clock yestering adversors when the light over pair operation. It was been and stiglist, and the light dotted limit. It was not till about 5 o'clock, when it lieges to grow clock, but the electric light means to till till about 5 o'clock, when it lieges to grow clock, but the electric light means to till the electric light means to the electric light and stage if it. Then the testery seven devicting in the collection of the light and stage if it. Then the testery seven devicting in the collection as a high given a stage in the consideration of the light and the light

inventor ways. The light was out, neather and graciated to the eay, and it consecuted unbased like whitely by drighting, the once a light without a particle of consecuted unbased like whitely by drighting, the once in the contraction of the large in the Time I make in the large in the large in the transparent of the large in the transparent of the large in the large

Edison Electric Light Company of Europe, Ltd.

This folder contains printed material issued by the Edison Electric Light Company of Europe, Ltd. Organized in New York in 1880, this company controlled Edison's electric light patents in Europe, excluding the United Kingdom.

The following items have been filmed:

- "Notes on the Formation of an International Edison Company" (1883?) "International Edison Company. Articles of Association." (1883?)

The following items, also found in D-82-028 (Document File Series), have not been filmed:

- "Translation of the Contract of November 15, 1881 between The Edison Electric Light Company of Europe, Ltd., and Messrs. [Charles] Porges and [Elle] Leon." (1882)
- "Report of Messrs. [Theodore] Puskas and [Joshua F.] Bailey to The Edison Electric Light Company of Europe, Ltd. . . . " (1882)

NOTES

ON THE FORMATION OF AN

INTERNATIONAL EDISON COMPANY.

CAPITAL 30 MILLION FRANCS,

Divided in 60,000 Shares half Paid-up to Bearer.

LONDON :

, PRINTED BY CHAMBERS & SONS, WILSON STREET, FINSBURY.

SYNOPSIS OF "NOTES" for formation of an INTERNATIONAL EDISON COMPANY for Electric Light and Motive Power.

Company to be formed under French law, admitting issue of shares to bearer on payment of 50 per cent, of neminal value.

Capital frs. 30,000,000, divided in 60,000 shares of frs. 500 each. Preference dividend of six per cent. to capital.

All property, installations, centracts and business of the existing French Companies to be transferred, at cost price, to the International Company, the French Companies receiving in payment shares of the International,

The existing French Companies have the right to subscribe one-fourth of the capital of the new Company.

The balance of the capital to be distributed among syndicates formed in the several countries in which operations are to be carried on.

Shares to be printed in the German, English, French and Dutch languages and currency, and quotation to be had on London, Paris, Berlin and Amsterdam Exchanges.

Company to be administered by Board of Directors of say 20 members, made up from the several countries embraced in the exploitation.

The benefits reserved to Mr. Entsen and his assigns are :--

(1). A royalty of 25 centimes (French) per lamp.

(2). 40 per cent. of the profits after payment of the preference dividend of 6 per cent. to capital. The benofits reserved to the Syndicete subscribing the first capital

(1). The profits from the sele of shares.

(2). 25 per cent. of the Perts of Founders coming to Mr. Edison and his assigns.

(3). The right to subscribe one querter in all sugmentations of the cepitel.

NOTES

ON THE FORMATION OF AN

INTERNATIONAL EDISON COMPANY.

CAPITAL 30 MILLION FRANCS,

Divided in 60,000 Shares half paid-up to Bearer.

PAYMENTS FOR PATENTS.

In payment of the Enison Patents having relation to the Electric Light and to the transmission of motive power, there is to be allowed to Mr. Enisons or to his assignees, 30 centimes per lamp manufactured, employed, or soil by the Society, and 40 per cent. of the profits after the deductions provided for hereinance.

OBJECTS OF THE SOCIETY.

- Installation of Central Stations selling light to subscribers at a fixed price and by measure.
- (2.) Isolated installations exploited by the Company itself
- (3.) The sale of isolated installations and of lamps.
- (4.) Manufacture of machines, lamps, &c.
- (5.) The sale of patents and of licenses and the constitution of Sub-Companies, subject to the conditions expressed in the Articles of Association.

CENTRAL STATIONS.

An opinion may be formed as to the probable profits of this branch of the business of the Company by the aid of the estimates prepared by our engineers, and joined to this paper for a Central Station at the Bon Marshé, and another at the Rue Basse du Rempart, near the Grand Opera.

The prices paid for electric material in these estimates are those at present paid to the Edison Factory near Paris, but it can be conclusively shown that these prices are 25 per cent. higher than those at which the material can be actually delivered.

This is due to the fact of the recent establishment of the Edison Factory at Ivry, the prices of which with these ordere in hand would be reduced at least 25 per cent.

The expenses of exploitation are also calculated at the highest figure possible, and the lighting power of the Standard Lamp A, is rectional as only equal to 180 Hires, though in reality, owing to the possibility of a better disposition of the incumdencent lamp than is possible in the case of the gm jet, the Standard A. Immp of 10 candles is equal to the jet of gas consuming 200 litres.

In the estimates for the Basse Rempart Station the average consumption of five hours is allowed for. But it is certain that the consumers who me to be familiated with light from this Station are principally theatras, restamrants, cafés and clubs, whose regular consumption is from six to seven hours per day.

The average of hours of consumption at the Bon Marché Station according to the estimates is 41 hours.

Also the price of gas has been taken as the point of departure in these estimates, that is to say, six centimes per kamp A. and per hour. But it is ordeat that thating into account the great advantages that the Electric Light has over gas, above all for theatres, restamants, eaffe and ohles, a somewhat higher price may be charged than that paid for gas. In these estimates the replacing of lamps is provided for at the price they cost to the Compagnic Continentale at the present moment, while this cost is certain to be reduced in the next three months by at least 20 per cent.

No account has been made in these estimates of the considerable profits that the Company will realize from the sals of motive power during the day.

The Central Stations of the Rue Boase dn. Rempart and at the Don Marchier not indistict sees at Partis; syreum of there Central Stations may be established with the same advantages, for example the Palain Royal offers at nominal cent the ground for the establishment of n. Central Station, supplying the Council Offsat, the Theater Français, the Palain Royal, and the great number of shops, caffe and restamrate that are to be found there, in all, more than 12,000 lamps in a very small space.

Another Station may be established between the Varidics and the Gymnass on the Boulevards, and another in the quarter of the Chateau d'Eau to serve the thentres of the Remaissance, V'Amblyu, Part St. Martin, Felica Dramatiques, and the numerous chops, caffe and restaurants in the respective vicinities.

No reference is made in this Memorandam to the numerous central station enterprises proposed, or in various stages of preparation, outside of Paris, in France and in other countries in Europe.

ISOLATED INSTALLATIONS FOR THE SALE OF LIGHT BY MEASURE, MADE AND EXPLOITED BY THE COMPANY ITSELF.

The estimates herswith submitted relative to an installation of 500 lamps at the Bon Marché shew a profit of 65 per cent. This installation was made as a trial, and worked from Nov. 17, 1882, to April 30, 1883, at the price of five centimes per lamp and per hour, equal to about 25 centimes per 1,000 feet of gas (five centimes less than the carrent price of gas at Paris), and with the above results. The Bon Marchi now asks for an installation of two to five thousand lamps with a small diminution of price, and the contract is already agreed apon.

Installations may be made in the eame conditions at the depot of wines and liquors at the Quay St. Bernard, at the Printing House Chaix, at the depot of Beruy, Eden Theatre, Trocadéro, Palace Theatre, and several other Theatres; and at the Rue Daru, the Reliway Etations of Paris Lyone and the Mediterranean, and many other places.

These installations will, according to the most careful estimates, based on actual exploitation, give an average profit of from 40 per cent. to 65 per cent. on the capital employed.

SALE OF ISOLATED INSTALLATIONS.

Since the constitution of the Edison Companies, 17th February, 1882, they have sold 100,175 lamps, and 287 dynamo machines, making a total invoice value of frs. 1,095,887 35 centimes.

During the first seven months after their organization, the French Companies were obliged to order all dynamos, lamps, &c., frem New York, and at such prices that little profit was made except on lamps.

Also the French Companies sell to their Sub-Companies all material at factory prices, so that the profits on such sales figure in the returns of these Companies instead of those of the French Companies.

The lamps, except those sold to Snb-Companies, are sold at an average of frs. 6 each, and their cost to the French Company is frs. 2.50.

The dynamos bought from the factory at Ivry, except those sold to Sub-Companies, are sold at an average net profit, all

commissions deducted of 35 per cent, and a net profit of at least 20 per cent is made by the factory, making a total net profit of 55 per cent. The priese can be retined to the public 25 per cent. without diminishing the profits of the Company owing to the fact mentioned in paragraph three of the foregoing section on "Control Skrittons"

The total profit of the of Société Electrique from the sale lamps, dynamos, &c., for the last six months, has been in round numbers frs. 150,000.

The results gained have been without attempts at publicity, and against the difficulties incident to a new organization to business where there was no gaintance to be obtained from the experience of others. Engineers were without experience and have land to be instructed; i installations have been made at abnormal cost for time and expenses of engineers, losses from defective material and irregular shipment. But thought the profits on material sold have been largely absorbed by these inicidents of an exploitation wholly novel, there has not been a eight case of faiture or of accident, and no installation has been made to which reference cannot be made with confidence.

The demands for these installations are constantly increasing in all parts of Europe, and it is difficult to place a limit to the extension of the business in this direction.

There exist for example in France alone about 12,000 manufacturing cetablishments which have motive power, and which would find economy and security in using the incandescent light.

Private houses and chateaus also offer a good field, as yet untouched, for development, through the nes of the perfected gas machines and other small engines which are now being brought into practical shape.

Independently of the profits that the Company receives from the sale in the first instance of isolated installations and of lamps, it is necessary to remark that every isolated installation gives a certain average yearly sale of from 50 to 500 lamps, and that every lamp gives a profit of about 3 Frs.

MANUFACTURE

Manufacturing was first commonced at the factory regularly at the commencement of the month of August, 1882, and the first deliveries of machines were made at the heginning of the month of September, 1882.

The factory has been in operation then just one year. The Compagnia Continentals and the Société Electrique have during this time given the factory orders to the amount of 1,101,909 frs. 35 centimes.

Orders for more than '43 per cent. of this sum, to wit frs. 516,590 80 centimes, have heen given during the last four months, May, June, July and August.

The Compagnic Continentate and the Secieté Electrique have bought, since their constitution on the 17th February, 1882, either from the factory at Vryv or from New York, a total of 303 dynamos, of which 287 have been sold to date. They have bought from the factory or from New York 137,863 lamps, of which 104,875 have been sold.

The Dynamos sold were as follows :-

6 C. 1200 A. lamps each 57 K. 250 , , , , 18 L. 150 , , , , 148 Z. 00 , , , ,

68 E. 17", ", ", "
Since the factory at Ivry commenced working it has received as above shown an average of orders of one hundred thousand frames per month. This amount will be more than tripled by the central installations that are now being prepared, and by the

regular increase in the sale of isolated plants.

The minimum of profits realized on the manufacture is 20 per cent, and the balance sheet shows profits up to December 30th, 1882, of fr. 68,714-57 and from December 31st, 1882, to June 30th, 1883, of fr. 50,787-74.

EXPLOITATION.

Mr. Edison brings to the Company the patents for the following countries:-

France and her colonies
Belgium
Denmark
Austria Hungary
Russia
Italy

Spain (except her colonies)

and the considerable exploitation already established in Holland, Switzerland and Greece.

The Compagnic Continentale Edison actually existing, has sold the patents for Germany on the following conditions, to wit, 314 centimes for each incandescent lamp employed; 16 fm. for each horse power on all machines of less than 60 horse power, and 20 fm. per horse power on each dynamo of 50 or more horse power; and finally 21 per cent. in the profits of the Company after the sole delection of 5 per cent. to the Shareholders.

This contract will be transferred to the International Company.

Offers have been made to the Compagnic Continentate by a group of banker, to organize a Company for Austria on similar terms to those above of the German Company.

A provisional contract has also been signed for the evention of an Italian Company, with a first capital of firs. 5,000,000, from while if no 500,000, in fully paid in phases, is to be given to the Companie Continentale; a lale a reyalty of 25 centimes per lump, and a royalty of fir. 12 per horse power on every dynamo employed either for light or motive power, and 15 per cent. of all anguentations of capital in fully paid-up shares. Horse contracts if realized before the date of the constitution of the proposed Company will be transferred to it.

Attention is called to the fact that, of the different forms of

exploitation proposed for the International Company, three are already demonstrated as giving a profitable employment for capital, viz.:—

- (1). Manufacturing
- (2). Sals of isolated plants
- (3). Exploitation of isolated plants

The exploitation of central stations is the only employment for capital proposed in which an absolute demonstration based on current business cannot be given of the percentage of profits that can be realized.

But the installation and exploitation of the central stations at New York and Milan, new offered for examination afford data that it is confidently asserted, take this form of exploitation out of the category of doubt, and establish its practicability with large assured profits after discounting against it every element not absolutely determined.

It will be remarked that the cost of material has been put in the estimates for central stations at 25 per cent. mere than the cost at which it can be manufactured to-day, and that every element of detail has been taken against the exploitation. The result reached in this way is as extraordinary that, even if it he reduced by one half, no mere tempting field for the employment of capital can be found.

Attention is specially called, as an important element in the proposed affair, to the prices of gas on the continent, and to the fact that the municipalities whose dispositions are everywhere favorable, are nowhere hampered by general legislation.

In Paris, with coal at 30 frames, we have the present price of gas at 30 centimes the metre onbe-mires, 8.40 per 1000 feet. This price will probably be reduced to 25 centimes,—frex. 7.08 per 1000 feet, at no remote date. In other cities in France the price varies from 30 cents. to 50 cents. per metre cube, that is between free 8.49 and fres 14.10 per 1000 feet.

In Italy, at Turin, with coal at frs. 30, the gas is at 25 centimes the metro cube, equal to frs. 7-08 per 1000 feet. This is the lowest price in Italy. At Milan and other cities, with coal at from 38 to to 42 frs. delivered at factory, gas is from 35 to 55 centimes, equal to frs. 9.91 to frs. 15.57 per 1000 feet.

Iu St. Petersburg, with coal at frs. 20.50, gas is 28 centimes per metre onbo, equal to frs. 9 per 1000 fest.

In Madrid, with coal at fra. 45 to fra. 50 per ton, gas is sold to the Municipality at 25 centimes, and to private persons at 432 centimes per metrs cubc, equal to frs. 12.32 per 1000 feet. In other cities it varies from 42 cents, per metre to 55 cents.

In Belgium, with ceal at from fre. 13 to fre. 15, delivered at place of censumption, gas is sold at from 20 to 30 centimes per mote only, equal to fre. 5.08 to fre. 5.49 per 1000 feet. In two suburbs of Brussels and at Gand only the price is 16 centimes per metre only.

In Germany, with coal at frs. 12.50 to frs. 25.00 per ton, gas is sold at from 19 centimes to 36 centimes per metrs cube, equal to 4/64 to 8/- per 1000 feet.

Price of coal in Amsterdam frs. 28.40 per ton

- " gas " " " " " 0.20 " enbie metre
- " eoal " Rotterdam ... " 32.40 " ten
- ,, gas ,, ... ,, 0.20 ,, eubic metre
 In Anstria, with coal at from to per ton, gas is

sold at from to per metre enbe, equal to per 1000 feet.

EMPLOYMENT OF FIRST CAPITAL.

In illustration of the profit with which the capital here proposed can be employed, it is necessary only to consider business new in course, or that is prepared for execution at Paris and the profits that can be realized during the first twelve months after the organization of the proposed Company.

It is proposed to omploy at Paris immediately on its organization

frs. 3,000,000 in the Rue Basse du Rempart : frs. 2,000,000 in the purchase of the factory, plant and material at Ivry; frs. 2,000,000 in isolated installations from which light is sold: and frs. 500,000 in material for isolated installations sold to purchasers, making a total of frs. 7,500,000.

The isolated installations for the sale of light to the amount of frs. 2,000,000 can be mounted in Paris, and in full operation six months after the constitution of the capital, so that six mouths income from them may be counted in the estimate of profits the

The orders growing out of the proposed installations for Central Stations and for isolated plants for the sale of light by measure, proposed to he made as above, would together, at a very moderate figure, amount to frs. 2,500,000. On this amount we may fairly estimate a profit of 20 per cent. in allowing at the same time a reduction of cost from improved facilities and large orders.

The Société Electrique has made a profit on material sold of frs. 150,000 the last six months, and it may therefore he safely said that with the natural increase of the business and the improved facilities and organization, a net profit may be made of frs. 300,000 on the sale of isolated plants the next year.

We should thus have on the employment of frs. 7,500,000 the following profits in the first twelve months; estimating the profits on isolated installations for the sale of light at only 40 per eent. with six working months :-

Frs. 2,000,000 Isolated Installations for sale of light, earning during six months at 40 per cent per annum ... frs. 400,000 Profits from factory, 20 per cent. on orders for frs. 2,500,000... 500,000 Profits from sales of material for isolated plants 300,000 Interest at 4 per cent. on frs. 8,000,000 ...

Total frs. 1.520,000

320,000

It is thus seen that a dividend of 10 per cent, is assured for the

first year on the total capital paid-up without going entside of Paris, and supposing frs. 8,000,000 to be carning only Bank interest.

It is also assumed that the frs. 3,000,000 invested in the Basse Remport Central Station, earns nothing the first year, during a part of which it will be in preparation. ..

But as a matter of fact more than the amount proposed to be invested at Paris (Frs. 2,000,000) in isolated installations for the sale of light, can be invested at once in Spaia, Belgium, Russia and Austria, and in Francs ontsids of Paris, a considerable part of which will yield larger profits than the frs. 2,000,000 invested in installations above proposed to be made in Paris.

It is to he noted also, that the Compagnic Continentale is offered a first payment of Frs. 600,000 from the Italian company, and thie, as well as the royalty on lamps and machines, will enter in the first year'e balance sheet. These amounts and profits derived from other local or national companies, will go to swell the receipts of the International Company, unless she shall find it more advantageous to keep the exploitation in her own hands.

The first capital proposed, in view of the magnitude of the field, ie evidently moderate, and is calculated only for husiness that can be realized immediately on its constitution. The object of the above observations is to show, that this first capital will find an immediate and certain profitable employment, and to simply indicate the wider field, and larger profits that attend the employment of the quite incalculable capitals required for the fuller development of the affairs, which will only he well commenced by the capital now proposed.

The participation of the original subscribers in the profits growing out of the creation of these larger capitals is seenred by the provision that they shall have the right to subscribs one quarter of all such increases, and by their participation in the Parts of Founder.

It is proposed that the Compagnie Continentale, and the Société Electrique transfer to the International Company, all the patents of Mr. Epison: the German and Italian contracts: all

Horeto annexed are :-

- (1.) Complete list of patents, marked "A."
- (2.) A statement of all property belonging to the Industrielle, Continentale, and Electrique, which will be transferred to the International, marked "B."
- (3.) List of all installations made and sold by the Continentale and Electrique up to date, also of experimental installations made for demonstration, marked "C."
- (4.) Balance Sheet of the Installation of 500 lamps worked at the Bon Marché between the dates of Nov. 17th, 1882, and April 30th, 1883, marked "D."
- (5.) Estimates for Central Station (in two parts) at the Bon Marché, marked "E."
- (6.) Estimates for Central Station, Rue Basse dn Rempart, marked "F."
- (7.) Notes of Professor Colombo on the exploitation of the Central Station at Milan, marked "G."
- (8.) Copy of proposed Statutes of the International Company, marked "H."
- (9.) List of names of shareholders of the French Companies, marked "L"

ORGANIZATION AND ADMINISTRATION.

It is proposed to institute a Board of Directors of 10 to 20 members taken from the several countries embraced in the field of operations of the Company.

Let it be noted that it is not proposed to organize a French Company, but an International Company under the French low.

The Beard might be composed in the first instance, of say 12 or 14 persons taken from the several countries embraced in the field of exploitation of the Company. These would afterwards increase their number as they should find desirable.

It is believed to be indisponsable that National organizations be formed in each country. The whole, or the greater part of the shares of such Companies should be subscribed and held by the international. The National Companies would have Boards of Directors made up from the persons herefolders active in the Edison fifting, with such others as it may be found expedient to join with them, and with the Director, or one of the Directors sitting on the Board of the International as Prosident.

The Coutracts between the International and the National Companies would fix their relations, and sceare the unity of naministration of all the National Companies, under the technical and administrative control of the International.

A Committee of the International Board would be constituted, who would have weekly meetings for the consideration of current administrative nsfairs. This Committee would send copies of the minutes of its proceedings to each member of the Board.

The entire Board of the International would hold its meetings once in three months, or at such intervals as may be found necessary.

The Committee should be limited in their power to vote during the intervals between such meetings, affairs involving the employment of more than a given sum, without the written concent of two-thirds of the members of the Board.

At the regular meetings of the Board, a majority as usual would decide all questions.

DISTRIBUTION OF PROFITS.

Six per cent. to the Shareholders, Five per cent. Legal Reserve.

Eight per cent. to the Board of Directors;

The surplus to be divided between the shareholders and the Parts of Founder. The Board of Directors may make extraordinary reserves.

On the liquidation of the Company its assets are to be equally divided after the repayment of the shares, on the basis above named, that is to say, 60 per cent, to the sharebolders, and 40 per cent. Parts of Founder.

In order to constitute the Company that is now in view, and to obtain the consent of Mr. Emsox and the Light Company to the modifications which they will be saked to accept in the existing contracts, it will be necessary to constitute a syndicate composed of important financial houses, guaranteeing the subscription of the Capital.

The profit that the syndicate would receive, would be—(1) the profits on the sale of the shares subscribed. (2) One quested to the profits coming to Mr. Ennos and his surgeous; (these parts of founder have a real and immediate with one occurred to the royalty on the lamy which goes to them. And of the distillation to the above, the syndicate will necess to the absorbite to the first capital the right to subscribe a quarter of each future increase of equality of the Common of the contraction of the con-

By the figures which we have indicated, and by the possibility of the sullmitted employment of capital which the Company will have, this right of subscription in all angementations, gives a reasonable certainty of large profits, in as much as there will be no augmentation of capital sxcept in proportion as the profits of the Company are real and suffisiently remonerative.

The right of subscription to a part of this first capital may be

conceded to important English, German, Austrian, Belgian, Dutoh and Italian honses, who may demand it. The quotation of the shares of the Company will thus be assured on the principal Bourses of Europe.

MODE OF PLACING THE SHARES.

The syndicate will give the right of at least one quarter of the subscriptions to the actual shareholders of the three Edison Companies.

The gradiente may, if it shall seem desirable, offer the shares for public subscription; but it may, with still greater advantage, sell on the different exchanges of Burope the shares after they are created. A premium on the shares is certainly to be expected if it is taken into account that the chairse of the German Edison Company formed in the moath of May last have hees sold at a premium of nearly 20 per cent. This Company has the right only for Germany, a country where the average price of gas does not exceed 22 centimes per metric south.

It is natural to suppose then, that the shares of a Company having a right of exploitation, and of creation of new companies everywhere in Europe, as well as of participating in the profits of companies already ereated, or to be created, will bear a still larger premium.

INTERNATIONAL COMPANY EDISON

Articles of Association.

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INTERNATIONAL COMPANY EDISON.

Articles of Association.

CHAPTER I.

FORMATION AND OBJECT OF THE COMPANY.
NAME, SEAT, DURATION.

ARTIOLE 1.

There is formed by the present Articles, between the proprietors of the shares which are to be hereafter created a Joint Stock Company, under the conditions imposed by the French law of July 24th, 1887.

ARTICLE 2.

The Company has for its objects:-

(1.) The commercial and industrial exploitation by the direct employment of its own capital of all patents and certificates of addition, or of improvement taken in the different countries of Europe hereinator named, for the inventions of Mr. Enness, for measuring, distributing, and applying electric currents for the

- (a) By the manufacture of machines, lamps, and all the material and accessories necessary to the exploitation.
- (b) By the installation of Central Stations, selling light to subscribers at a fixed price, and by measure.
- (c) By isolated installations exploited by the Company itself.
- (d) By the sale of isolated installations, lamps and material.
- (2.) The Company may also, in accord with the Light Company, create sub-companies, sell the said patents, give hienease under them, in a word, do whatever shall be useful and necessary for giving value to the patents, but always under the conditions of these presents.

ARTIOLE 3.

The Company will have the name of the International Edison Company.

ARTIOLE 4

The duration of the Company is fixed at 50 years from the date of its constitution. This duration may be prolonged by decision of the General Assembly, in the manner hereinafter presentibed.

ARTIOLE 5.

The principal office of the Company is established at Paris, and branches may be established hereafter at such places as may be designated.

CHAPTER II.

PROPERTY.

ARTIOLE 1.

The Compagnic Continuates, in the name of Mr. Emuses and the Light Company, separately and conjointy, bring to the present Company, without any guarantee other than that of their existence, all the patients taken for the inventions of Mr. Emuses, also for all objects or appearing that may be utilized for the Beletic Light, for for motive power, as well as all patents of improvement, and certificates of addition, but subject to the conditions of these presents and only in the following countries:—

- (1.) France and the French colonies :
- (2.) Belginm;
- (3.) Denmark;
- (4.) The German Empire;
- (4.) The German Empire;
- (5.) Anstria and Hungary;
- (6.) Russia;
- (7.) Italy;
- (8.) Spain ; the Spanish Colonies excepted.

The Attorneys of Mr. Eossox and of the Light Company make an express reserve in favor of their principals, of the patents taken, or to be taken, the patents of improvement, or certificates of addition in the United Kingdom of Great Britain and Ireland, Portugal, Sweden and Norway, for the inventions which are above named.

In addition, the Compagnia Continentale and the Attorneys of Mr. Ebnsow and the Light Company engage for the period, and under the conditions herein declared, to give to this Company all descriptions and all designs or models that may be necessary for the taking of nutents for all inventions and all improvement in all the countries of Europe not reserved above, in so far as these inventions and these improvements relate to the distribution of electric entrents, and to the production and transmission of electric light, and of motive power as is stated in Article 2.

- All the new patents, or patents of improvement, or certificates of addition, shall be taken in the name of Mr. Epssos, but by reason of the present suggessment, the rights of property of the International Company in the said patents, patents of improvement and certificates of addition, shall be the same as those which the Company will possess in the existing patents.
- All the expenses that shall be made for furnishing descriptions designs or models, shall be supported by the present Company, also all assutities and expenses made and paid for, the taking of new patents commencing with the date of registration of the Company.
- All patents already taken and making part of the present engagement, shall be transmitted to the Company the day of its registration.

These patents will remain in the possession of the Company, but will always be held at the disposition of Mr. Enzow and the Light Company, who will have the right either to take copy directly or on their order, and without expenses at all times.

The Attoracys of Mr. Educat and the Light Company engage the latter, wheeever it shall be required, to give their aid for the accomplishment of the legal formalities necessary to assure to the Company the right of property in the said ratents, patents of improvement and certificates of addition, taken, or that may be taken, and which make a part of their ones, and experiment.

On the other side, the Attorneys of the Light Company engage that the Light Company shall not exploit, directly or indirectly, inventions of Mr. Ednsor in so far as they have relation to the electric light and of motive power in any of the countries of Europe where the laws do not recognize the existence of patents.

It is well understood that the said patents, in all that concerns other objects than those here above enumerated, remain the exclusive property of Mr. Eboses and of the Light Company, and that the present Company will have the exclasive ownership of the said patents and inventions only as to the objects here above cummerated.

ARTIOLE 2.

In case the laws of countries other than France should not permit the division of property in the patents and in the manner above provided, Mr. Euneor and the Light Company shall transfer to the International Company the exclusive right of the use of these patents for the objects named in the present engagements.

Approve 3

In all sales or transfers of patents or of rights attaching thereto, the rights above reserved to Mr. Edison and the Light Company are expressly secured to them.

To this end Mr. Edison and the Light Company shall make known at the principal office of the Company, their acceptance or refused, either directly or by their Attorney at Paris duly accredited by them, and within 30 days from the actification of the project of contract, which shall have been made by the present Common.

This notification shall be made by registered letter.

In case the International Company should desire, instead of exploiting directly inelf, to make a total sale of one or of several patents for a part or for the whole of any one of the states, districts, or towns of Europe, or the concession of licenses for a part or the whole of one of these countries, districts, to towns, it shall not be valid without the consent expressly given in writing lw Mr. Bronce and the Lifett Commany. Mr. EDISON and the Light Company reserva in consaquence the right to accept or to refuse all contrasts involving such sale or concession of license which the Company shall prepose to realize, and consequently without such acceptation no treaty shall be valid as has been above stated.

The Company whenever it shall make concessions of the said patents, or of any of them, to other Companias, shall stipulate, unless the laws of the countries where the said Companies shall be constituted are opposed, that a third at least of the Board of Directors in the said societies shall be named by the International Company, which engages itself with Mr. Edmoor and the Light Company to reserve to them the right of naming at least one director to make a part of the third of which the International Company will have the right to name.

In addition, the present Company shall reserve to itself tha right of assuring that the purebasers or licensees of patents shall only use them to the extent of the concession made to the present Company.

SECTION 4.

Mr. Ecosow and the Light Company rasarve to themselves the right of intervention with the International Company, or its assigness, in all suits against infringers of the said patents, and in all other lagal processes relative to the said patents which the Society shall consider necessary to make, or which may be made against the said Company.

SECTION 5.

The Attorneys of Mr. Eduson and the Light Company stipulate in favor of their principals, that on account of their situation as inventors and proprietors of the patents brought to the Society, tha right antirely personal and non-transfarable of placing a vector on any fusion with any other sociaty, or taking over or ceding the whele or any part of the property of the Cempany, or making any contract of participation with other societies.

This right however will terminate, and without possibility of recovery, from the day that Mr. Eduson and the Light Company shall cease to be in their own name preprieters of at least a fifth part of the parts of founder attributed to them by Article 43 horanthr.

From the day that Mr. EDISON and the Light Cempany shall cease to be proprietors in their own name of at least the said fifth part of heh parts of founders attributed to tham by Article 43 following hereafter, thay will cease at the same time to have the tight to the engagements made in their favor in paragraph 30 of the present Article.

In all the Sub-Companies constituted by the present Company, the majority at least of the shares shall be subscribed by the International Company itself, and these shares so subscribed by the Company shall not be sold without the consent of the Light Company.

A person named by Mr. Eonses and the Light Company as their representative, may always assist at all the meetings of the Board of Administrator of the International Company, but only with deliberative voice, and he shall also have at all times access to the books of the Company, for the purpose of controlling the royalties and advantages stipulated in these engagements in favor of Mr. Bomows and the Light Company.

The Attornays of Mr. Einsen and the Light Company baw furnished at the moment of the fountation of the Company to the undersigned notaries, a statement of the French and Foreign Patents brought to the present Company by Mr. Einsen and the Light Company, which statement made on a best of stamped apper of fr. 1.80, not yet registered, but which is to be registered at the same time as the present Articles of Association, remains annexed to this, after having been certified as a true copy by the said Attornay of Mr. Einson and the Light Company, and after the mention of its annexation has been made as above by the undersigned notaries at Paris. As to the French Patents, the registration of the present engagements is to be made at the Prefecture of the Seina immediately after the registration of the Company, at the expense of the Company.

As to the Foreign Patents, the International Company charges itself immediately after its constitution, with the discharge of all the legal formalities necessary to secure the execution of the transfer made to the present Company by the Compagnic Continentale, Mr. Ensows and the Light Commany.

In consideration of their contributions and co-operation, there is attributed to Mr. Bossox and the Light Company, first, a royalty of 25 centimes per lamp manufactured, employed or sold by the Company, or by its licensees, and a part of its profits as is set forth in Article 43 hereinafter.

CHAPTER III.

THE CAPITAL.

ARTICLE 7.

The Capital is fixed at thirty million francs, divided in 60,000 shares frs. 500 each.

These shares are to be subscribed and one half paid up at subscription, and the present Company shall only be considered as definitely constituted after the subscription of the total number, and the payment as above provided of fifty per cent. of each subscription.

ARTICLE 8.

The Capital of the Company may be augmented from time to time by decision of a General Meeting of the Shareholders on the proposition of the Board of Directors. The Board of Directors will fix the conditions of the new emissions.

The proference for subscription of the new shares is reserved as follows:—

One quarter to the subscribers, or to their assigns, of the shares which constitute the first Capital of the Company in proportion to each subscription.

One quarter to the Board of Directors in office at the time of the augmentation of the Capital, in order to allow it to provide for the interests of the service.

[The Board of Directors will decide as to the manner of placing this quarter;]

And one half to the proprietors of the shares constituting the social capital at the spoch of each augmentation, in the proportion to the number of shares possessed by each one of them.

Persons who are not possessors of an entire share may write to exercise their right in the conditions that will be determined by the Board of Directors.

ARTICLE 43.

The not product, deduction being made of expenses, constitutes the profits.

From these profits there is to be taken :--

5 per cent. for the constitution of the fund of legal reserve.

The net profits, the foregoing deduction being first made, shall be distributed as follows:—

6 per cent, to the Shareholders as a dividend;

8 per cent. to the Council of Administration;

40 per cent. to the Light Company and to Mr. EDISON in representation of their contributions to the objects of the Company, subject to arrangement between themselves; The remainder for a supplementary dividend to the Shareholders.

These proportions shall be invariable, whatever may be the augmentation of the Capital of the Company.

ARTICLE 44.

The part in the profits attributed to the Light Company and to Mr. Ennow by the preceding article, shall be represented by shares entitled certificates of parts of founder, of which Light Company and Mr. Edison will dispose according to their pleasure.

The royalty on lamps provided for by Section 5, Article 6, as above, shall be distributed *pro rata* to the holders of the said parts of founder, semi-annually.

A decision of the Council of Administration taken in accord with the founders, will fix ultimately the number and the form of these shares, which will not give to their proprietors the right of assisting in the general assemblies.

These shares shall be to order or to bearer at the choice of their proprietors.

They will confer no other rights than those of which mention has been made above, and give rise to no obligation.

They will be transmitted by simple delivery if they are to bearer, and by transfer if they are to order.

The royalties and profits belonging to these parts of founder will be paid to the bearer of the share.

Compagnie Continentale Edison

This folder contains printed material issued by the Compagnie Continentale Edison. Organized in Parls on February 17, 1882, this company controlled Edison electric light patents in Austria, Belgium, Denmark, France, Germany, Hungary, Italy, Russia, and Spain.

The following items have been filmed:

- "Premier Bulletin" (1882)
- 2. "Second Bulletin" (1882)
- "Eclairage par Stations Centrales" [Bulletin No. 3] (1883)
 "Eclairage par Stations Centrales" [Bulletin No. 5] (1883)

The following item has not been filmed:

"Statuts" (1882) [An annotated copy can be found in the Charles Batchelor Collection (Special Collections Series); an English translation can be found in D-82-038 (Document File Series).]

PREMIER BULLETIN

Compagnie Continentale Édison

27, CHAUSSÉE D'ANTEN, PARIS

(Nous cammançans aujourd'unt la publication de ca Dulistin doutind à rédace taux les pengrès réalisés dans les famillatines contraise ou les lettes de l'Éléctrique destrique définités de l'Éléctrique destrique définités. Les faints éctes publication antire intensités not de tenir nas cerraspondents au aumant des dédourantes et des applications mouveiles intradèlies dans l'usage de la lumière éléctrique afté aux Diachelles, sait

en Burge,
Non publica dans es premier numéra un creicio del intércutant un
Finabilitation controls, portuit internat un cura d'unécutiun à New York,
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Première station de New-York

La première installation pour l'éclairage d'un quartier de New-York par la lumière Edison est sur le peint d'être complètement terminée. Ce quartier a près de 800 hectares de superficie.

La Compagnie a fait l'acquisition des immeubles situés nº 255 et 257 Pearl street, un peu au sud de Fulten street pour y installer l'usine centrale de production des œurants électriques qui deivent circuler dans tout le quartier au meyon de conducteurs souterrains.

Les travaux d'installation ent été extrêmement censidérables. On peut les diviser en quatre parties, sayoir : la mise en état des bâtiments pour l'établissement des machines et des divers services, la fabrication et le montage des 'moteurs machines-dynamos ct autres appareils électriques, la fabrication et la pose des conducteurs souterrains, enfin la pose des fils dans les maisens. La première partie comprend la confectien des fondatiens en macennerie, des ouvrages en béton. la pose d'une carcasse en fer à deux étages, le percement des veutes sous les trottoirs et les rues, le montage de quatre chaudières capables de produire 1000 chevaux-vapeur, l'établissement des tuyauteries correspondantes, de deux elieminés (de 1m,50 de diamètre, sur 24 mètres de hant), de monte-charges à vapeur pour le charbon et les cendres, de transmissions de nempes et de soufflerie. Tous ces travaux que neus venons d'énumérer sont complètement terminés, il ne reste plus qu'à installer los apparoils de ventilation et des ascenceurs à vapeur. L'installatien se compesera de six moteurs, de six dynamos, et de régulateurs.

Les meteurs sertent des atcliers de censtruction

de la Soullwark Foundry et Machine Company de Philadolphie. Chacun a une puissance normale de 1126 chevaux-vapure, puissance qui peti étre partie à 2000. On dispesse doine d'une force teale inàxima de 1200 chevaux. Les six dynames sent en enstruetion dans les Edison Machine Works, Georck streck, New-York City, et sont presque schevées. Les appareils de réglage vont être égatement terminés.

Cliacuno de ces six dynamos à vapour pèse 30 tennes, soit un poids tolat de 180 tonnes. Le poids de toute la construction et des appareils électriques du sent 237 Pearl street sera d'enviren 250 tennes, et si trouvera répartio de manière à nc donner qu'une pression moyenne do 1000 kilos par mètre carré.

Bn ce qui concerne les condusterre soutervina, les travaux sont poussés suais risplaciment que possible. Avant le 1º mars 1880 on avait pade 3600 milet de conducteurs principeux, et dans le seul mois de mue on en a podé 5000. Ce mois avait 27 jours de travait et quatre dimanches, mais la plois il pereir è jourse de quatre dimanches, mais la plois il pereir è jourse de 10° no la travait des causses diverses en dirent pertre 2, de sorte que 10° no la travait desfectivement que pendant 20 juers et une muit. La moyenno pri jour de ce mois était de 10° no hites plo mitires, la moyenno pri jour de ce mois était de 20° mottres je minimum que l'en ait fait en un four est de 10° no minimum que l'en ait fait en un four est de 10° no minimum que l'en ait fait en un four est de 10° no mètres o le maximum de 31 metres.

Il resto encore à poser plus de 5000 mètres de cenducleurs principaux, puis los traversées et les raccerds dans les eroisements de rue. Ceux-ei, par parentbèse, prendront plus de temps de poso par mètre ceurant que les conducteurs eux-mêmes. L'établissement des fils dans les maisons est terminé depuis le commencement de lévrier.

Nous avens complètement emménagé ainsi 107 locaux dans Bockman st.; 106 dans Fulton st.; 73 dans John st.; 73 dans Maiden Lane; 97 dans William st.; se dans Foota st.; 68 dans Nassau st.; 54 dans Footi st.; 30 dans Coder st.; 98 dans Pion st.; 94 dans South st.; 31 dans Ann st.; 12 dans Spruce st.; et quelques-uns dans d'autres ruce de manibre à faire un total de 98 locaux prêts à fonctionner.

Le nombre de lampes prévu est de 7916 A (16 bougies) et 6395 B (8 bougies) soit en tout 14 311 lampes. Les lampes elles-mêmes sont finies depuis des mois,

emmagasinées et toutes prétes à fonctionner.

La station centrale fournira de l'électricité non senlement pour ces lampes et d'autres encore, mais aussi
pour faire fonctionner des ascenseurs, des monte-charges, des prosses d'imprimerie et des machines de
toute sorte.

Il ressort clairement de tout ce qui précède qu'il reste très peu de close à faire, en dehors de la pose des câbles souterrains, pour que le premier quartier de New-York soit complètement terminé, et que l'éclairace électrique y commence.

Installations & Chicago

Nous sommes en train de monter une installation isolée à Palmer House pour éclairer la salle à manger. L'installation dans les magasins de Rand, M. Nally et C^a est vivement appréciée. Les propriétaires discut que s'ils faisaient enlever nos lampes pour les rempla-

cer par lo gaz, les ouvriers les leur redemanderaient. Ils trouvent notre lumière très commode pour mélanger des encres colorecs, opération impossible à réussir mêmo en plein jour.

M. John V. Farewell a commandé deux installations isolées pour les bâtiments d'assurance : Republic Insurance Buildings.

Station centrale en miniature à Fail-River.

Uno de nos polítics installations montrée à Fall-River est oi trein d'échairer pulseires magassins, un huce dédigraphique et les salles d'un ciub, lous est locaux contrépartis dans deux paléts de maisone différence sont les magassins deu hijouterie de M. Bruncieu; ceux dedenrées séches de M. Sarpeni; coux du taillum Bonne; puis la quincaillerie de M.M. Traffon et Authony; les magassins de confeccion de L. D. Villum et Q.*; le burrous River le 4 Avril, s'exprime dans les termes suivants au sujet de cello justallation.

« Hier soir nous avons achevé les premières 150 houres de marche de notre petito station do Fall-River. Tous ceux qui se servent de cet éclairage en font le plus grand éloge et le placent bien au-dessus du gaz. M. Boone dit qu'il est exempt de tous tes inconvénients du gaz et qu'il deune trois fois plus de lumière. La plupart des magasius restent onverts jusqu'à dix heures du seir. L. D. Wilbur et C' chez qui 30 bees de gaz ent été remplacés par 27 de nes lampes, m'ent racenté que le gaz rendait le séjour de leur bentique intelérable bien avant t'heure de fermeture, tant à cause de la chaleur que du mauvais air. Ils ne comprennent pas comment ils out pu endurer le gaz si longtemps et ne veulent se défaire pour rien au monde de ta lumière éfectrique. Le témeignage des autres censemmateurs est uniformément le même. Dans les salles du club on admire beaucoup l'éclairage surtout dans les cabinets de tecture. Je n'ai pas besoin de vous dire à veus qui connaissez les frais d'entretien d'une station cembien cette lumière est économique; je veus parlerai seulement de la durée des lampes que nous avous eu occaeasion de vérifier. Pour une installation de 120 lampes au lieu de 127 que nous avons iei, la meyenne de 600 heures que vons garantissez peur les

lampes, peraestrait d'en remplacer 30 toutes les 130 heures, pourra qu'en no dépasse pas l'infensité lumineuse normalo de 16 bougles. Pourtant nous la dépassons sie et nos lampes ont un pouvoir de 50 à 35 bougles. Malgré cela sous n'avons esses que sept lampes, dont deux dans le unême appareil fixé au cedre de la porte de magasité sargeut, et je souponne lo clao de la porte de nomagaité sargeut, et je souponne lo clao de la porte de nome que est lampes seint été mises la ndanctant même que est lampes seint été mises hors d'usage par le courant, notre moyenne est encore très basse.

Les appareils fenctionnent dans la perfection, les dynamos sent parfaitement équilibrées, et entièrement exemptes d'étincelles au commutateur. Ou a mesuré le travait du meteur et en a treuvé 17,1 chevaux-vapeur seit 7,3 lampes par cheval compté dans le cylindre. Si l'on considère que tous les frottements du moteur et des machines y sont compris, en peut affirmer sans crainte que les dynamos alimentent très bien 8 lampes de 20 bougies, par cheval compté sur la courreie. Notre instatlation a été visitée et iuspeciée par beauceup de manufacturiers de Fall-River et par de nombreux visiteurs d'autres lecalités. Tout le monde en a fait le plus grand élege. Elle est cenfiée aux soins d'un jeune Américain intelligent, d'une vingtaino d'années qui n'a aucune peine à la ceuserver en bon état et à la faire fonctionner parfaitement.

Cette petito installation fait merveille auprès de ceux qui l'out vue peur attirer des partisans à la lumière Edisen ».

Chemin de fer électrique d'Edison.

Vendreell dereiler, lo profession G. F. Breker de Philadelphie et le profession F. Derpe de New York, out visité Menlo-Park en compagnie de H. Bellen, veryagere sur le cisenim de fré destroire. L'exception de de très autifatisante. En ce moment la ligne de la comment de très autifatisante. En ce moment la ligne installé que pour le terapport des pessagers, mais une machine et des wagons de marchandises sont actesilement en construction. Il *sigli de truvuer expérimentalement le prix de reviou d'un fransport électrique des marchandises.

Apparells de surcté Edison contre l'incendie.

L'Electrician de Londres contient de nombreuses illustrations des conducteurs fusibles de M. Edison et les décrit en ces termes :

"Une partie importante du système de M. Edisou est colle qui sauvegarde contre l'incendie. On conçoit facilement qu'il puisse arrière que, pour des causes imprévues, les conducteurs soient parcourus par un courant plus fort que celui aqueul ils étalent destinés. Un pareil courant échaufferait les càbles et pourrait causer d'asses grands dommeges. Pour se mettre en - 9 -

garde contro une pereille éventualité, M. Edison, intercale dans ses circuits une jonction métallique fusible, qui fond dès que le courant atteint une intensité donnée. »

Installation à Stillwater, Minn.

M. Roncy, le directeur de la partie de l'usine de Seymour Sabin et Cr à Stillwater, où nous avons mous de mois installations isolées, nous dit dans une lettre récente que « les dynamos marchent admirablement jour et nuit. Nous nous servons encore des mêmes balais qu'au début et ils ont l'air tout neuls. »

Cette installation se compose de deux dynamos Z alimentant 280 lampes B, dont 30 se trouvent dans la demeure de M. Sabin à 350 mètres de l'usine. Les dynamos ont commencé à fonctionner le 24 décembre.

L'Exposition du palais de Cristal.

Il y a 854 lampes au Palais de Cristal.

Elles sont réparties de la manière suivante: salle de concert 380 lampes, salle des représentations 200 lampes, boutiques 84, ncf centrale 48, ontrée de la gare Ar, domestic company 20, chambre des machimests. Ges langes sent a limentées par deuxe pétics dynames placées à Vitage au company de la circuit de discrete de la circuit de la circuit de la circuit sans affecte en réns la limites, et le circuit sans affecte en réns la limites, et le circuit sans affecte en réns la limites, et la circuit sans affecte en réns la limites, cha circuit sans affecte en réns la limites. Chaque circuit est muni d'un communisteur permettant de faire circuit et courant ou de le supprimer à violent, et chaque ramification est munie d'un coupecient, apparel dia proceiction, destin de averir automatiquement la circuit en cas d'acaldent. Aucun accident d'aucun cacident d'aucun capéen on sété d'all'aillars il mais prodait.

La sallo de concert (éclarice au moyen do 280 lampos) est journellement le Hieldre de divertissoments variés et souvent elle est bondes. Bien qu'elle soit tels grande et diffiallo à éclairer, tout le mondo y touvou notre lumière parfaite. — Dersièrement, à une confévence avec expériences, faite dans cette sallo, près da la moitié de sampse furont éclientes o rallumées à un signal du confévencior sans affecter en rien les lumières restantes.

La lumière Edison est la seulo qui ne sa soit jamais éteinta depuis le commencement de l'exposition, et n'ait ainsi plongé les visiteurs dans l'obscurité.

L'exposition Edison a ché visitée par la due d'Edimbourg et as uitie, deux fois par lo due de Mestiminster, daux fois par la due de Sutherland, puis par lo président et lo Conseil d'administration da la C* du Mildiand falluway, par lo collèga du gaz (300 mambres) der d'innombrables délégations de villes at de villages. M. Johnson a aussi d'à prendre l'engagement de donner des expesitiens privées du système Edison à la Société des Arts, à la Royal Society, al dans beaucoup d'autres corps importants.

L'Engineering de Londres contient dans son numéro du 17 mars un long compte rendu illustré de l'expesition Edison au Palais de Cristal. Il s'exprime ainsi:

« De teus les systèmes d'éclairaga électrique, représentés au Palais de Cristal, l'installation la plus complète et la plus importante est celle da M. Edison, ou plutôt do la Edison Electric Light Company. Toute l'oxposition do cette compagnie entreprenante est caratérisée par la perfection des détails et par son côté vraiment pratique. On peut s'en rendro compte aussi bien par le remarquable éctairage des salte de représentations et de concerts que par la splendide instatlation des machines électriques et des moteurs à l'entrée des jardins. Il est universaliement rendu instico à cette exposition tant par les personnes compétentes que par les amateurs plus impartiaux. Grace à son admirable simplicité, à l'ingéniosité des connoxions et à la manière de régulariser la courant, l'installation Edison peut être considérée comme l'installation mécanique la mieux comprise et la plus parfaitement exécutée de-l'exposition.

6417. - Imprimerie A. Labure, ruo de Fleurus, 9, à Paris.

1882-10-10

Paris, 10 octobre 1882.

SECOND BULL'ETIN

Compagnie Continentale Edison

27, RUE DE LA GHAUSSÉE-D'ANVIN (I)

(Le présent Bulletin a pour but de faire commitre à nos correspondants les progrès accomplis par notre système d'éclairage depais la création des Sociétés Edison pour le continent suropéen (17 février A. C.).

Nous sommes obligés, afin de ne pas dépasser les étroites limites que comperte cette notice, de nous borner à ne mentionner que quelques-unes de nos plus intéressantes applications.

Tout d'abrel 2001 se croyous pouvoir mieux faire que de reproduire es têté de ce Balletin le bierrolllant article que le Journal des Débath, du 20 notif cerzier, a consarsé à notes units d'Ivry; est ce a 'est que grâce à l'activité et à la laute compléane de la Matcher, l'ingénieur en chef de nos Sodiéts, que nous devous d'être en meure, après un aussi court capace de bamps, de pouvait donne sufficience à toutes les commandes qui nous sont adressées de toutes les parties de la Praces.

Si, dans ce Bulletin, nos applications en France ne tiennent pas une plus grande place, cela provient de ce que la loi qui

(1) S'adresser pour les commandes et renseignements, 33, avenu

régit les brovets français no permot pas d'introduiro en France lo matériel fabriqué à l'étranger; nons no pouvions, ici, nous servir du matériel provenant de l'usino Edison, à Menlo-Pare (New-Jersoy) commo nons l'avons fait dans les autres pays do l'Europo. Depnis la constitution do nos Soelétés nous avons installé, pour no elter que les machines dynamo-électriques commandées à Now-York:

> 4 type C de 1200 lampes A 16 - K de 250 -6 - L de 450 -

71 - Z de 60 -

30 - E de 17 -

Le plus bel établissement électrique qui existe actuellement en France tant au point de vuo de la grandeur du bătiment qu'au point de vuo de la perfection de l'outiliage est celui que vient d'installer à Ivry, près de Paris, la Compagnie de la lumière Edison. En outre de la façade principale de cet établissement qui ferme une grando cour d'honneur bâtio de tens les cêtés, il y a un grand nembre de carps de bâtiments à quatre étages placés parallélement et perpendiculairement tout autour et qui dessent à l'ensemble l'aspect d'une véritable cité ouvrière admirablement installée.

C'est dans les diverses parties de ces bâtiments que sont établies les machines destinées à la fabrication économique des divers engins qui entrent dans le système d'éclairage

electrique Edison.

Dans l'un de ces bâtiments se trenvent les tours et eutils d'njustage nécessaires pour la construction des machines dynamo-électriques. On en construit de plusieurs modèles qui peuvent feurnir individuellement l'éclairage de 17, 60, 100, 125, 450, 250, 500 et 1,200 lampes,

Dans plusieurs autres bâtiments sent les ateliers affectés à la fabrication des lampes. On y voit les petites lamelles de bambou, qui arrivent du Japon par bottes, passer par diverses mains pour se trouver réduites successivement à l'épaisseur voulue qui est celle d'une feuille de papler et être, en fin de compte, déceupées de manière à présenter la grossenr d'un filament délié, parfaitement calibré et terminé à ses deux bouts par une sorte d'évasement au meyen duquel on le fixe aux fils du circuit.

Ailleurs, on procède à la carbonisation des filaments. On commence par les mettre dans do petits meules plats et hermétiquement fermés en les recourbant en fer à ebeval, puis on place les moules dans des caisses on graphite bien

closes que l'en met à leur tour dans des fours chamilés à un lauré tempirature. La fabrication des manqueles de verce du ces sortes de limpes s'effectue dans deux stellers différents. Dans l'un, on construit les tubes de verre à travers lesquels cont soudies feil de platines acquels dévorte être utabelse les extrémilés des filaments de charbon; d'uns l'autre, on fabrique les ampuères au més desquelles et budes précédents delvent étre latroduits aves leur charbon, ct qui doivent être soumies à l'action du vide.

C'est une chose curieuse de voir la promptitude avec laquelle ces diverses opérations sont effectuées. On peut fabriquer jusqu'à 500 lampes par jour. Mais ce qui excite surtout la curiosité, c'est la manière dont le vide est fait daus ces lampes ; il y a toute une installation de cabinet de physique, Qu'on imagine, dans une vaste salle, une sorte d'enceinte allongée, fermée par trois cloisons de 2 mêtres environ de hauteur et sur les pareis desquelles sont installés extérieurement par séries 500 tubes barométriques à meroure; qu'on imagino adaptée à chicuu de ces tubes une lamne avec son ampoule non encore fermée et, au milieu de l'espace confiné par les cloisons, deux grands tubes de fonte d'environ 20 contimètres de diamètre communiquant avec les 500 tubes et mis en rapport avec une ènormo machine à vide de Sprengel, et on pourra se faire une idée de l'importance qui a été donnée à cette fabrication.

L'opération du vide dans les lampes est extrémement importante et très délisters, ce une nouément le vité écil em préder la combustion du filament de charbon, mais il doit cuorce jugeneter la ténantié du filament l'ai-même. C'est pourspoi ou deit procéder à plasieurs opérations successives offectieus après des intervalles de temps plus ou moiss longs poudant lésquées ou reals filament inancéecent sous l'influence d'un courant plus ou moias énergiques. De cette manière, les gar enfermént dans les portes de durbons et dégagent, la donsité de celul-ci augmente, et la ténacité devient assez grande pour être comparable à celle d'un fil métailleue. Dans ses cocditions, des filaments de charbon gros comme un cheveu peuvent résister à de fortes secousses commeniquées à la lampe, dont la durée n'est pas inférieure à built entis bures.

Paris.

GARE SAINT-LAZARE

La première installation publiquo de la Lumière Edison, à Paris, a èté inaugurée, le 9 septembre, à la gare Saint-Lazare et fonctionne, depnis ce jour, de la façon la plus parfaite.

Cette installation comporte deux parties distinctes : premièrement les rofondes de Saint-Germain et des ligues de Normandle, éclairée par 50 lampes A, et secondement les quais de la grande vitesse situés à l'intérieur de la gare, prés de la rue d'Amsterdam, et éclairés par 55 lampes A.

Dans la rotonde, les lampes sont placées sur des lustres à trois brauches, d'un modèle simple et élègant; il y a également deux appliques à une lampe, fixées au mur et 9 instres à une seule lampe; chaque lampe éclaire une superficie de dix-sept métres carrès.

Sur les quais de la grande vitesse les lampes sont fixée. sur des lustres très simples, d'une soule lampe chacun. La superficie delairée par chaque lampe est lei de cinquante-sept mêtres carrès.

Deux machines dynamo Z, placées près de la rue de Rome et actionnées par un moteur à vapeur, fournissent le courant électrique aux deux parties de l'installation; le hangar oft elles sont placées se trouve à 275 mètres environ de la rotonde de Saint-Germain et à 350 mètres environ des quais Lo publio et le personnel de la gare admireat la fixité et la douceur de la lumière, et de toates paris nous avoas enteadn proclamor la supériorité absolne de l'installatioa Edison sur toutes celles qui ont ôté faites jusqu'ici a Paris avec d'autres systèmes d'éclairace électrique.

Pondrerle nutlonule de St-Chamas Ministère de la sugare

La Poudrerie nationale de St-Chamas (Bonehes-du-Rhône), est brillamment éclairée depuis le 45 septembre

par le système Edison.

Cette installation demandait un mode d'éclairage prodnisant la plus grande quantité de lumière et le moins de cha-

Une lumpe Eltien A éciaire chayus unins, et cet placée dans un jour pratigab dans le mur jouvertien ent taillée en histou de façen à ce que les rayons de lumière puisseus placifier dans tonte la salle, dont la superficie est de 6 métres carrie, échoire les afreies parties des madaires une simple vitre ut scellée à extite ouverture et sépans la lampe du mouils à peuter; le comantaire pour éclaires ou allumer chaque humpe est placé une la Toutérieure de l'autre.

L'effet produit forme un contraste des plus satisfaisants avec l'ancien éclairage à l'huile.

Il y a 24 nsines à pondre, comprenant 24 lampes A, 14 lampes sont placées nu centre des voûtes ca maçonnerie sapportant le canal, 20 lampes sont placées dans les chemins de communaleation de la Pondrerie dans des réverbéres,

-7-

2 dans le cabinet du Directeur, 2 dans les bureaux, et cafin 2 au-dessus de la perte d'entrée ; au total 64 lampes A.

La machine dynamo est actionate à lu vitosse de 1,200 tours par miaute par un aystème de transmissions mà au moyen d'une rone à cau de 9 mètres de diamètre faissat cinq tours à la miaute, iastaliée sur un canal proveanat de la rivière (Touloubre).

La Poudrerie est éclairés peadant 13 heures chaque nuit. Le Directeur, l'Ingénieur en chef et tout le personaci comprenant 300 ouvriers, sont très satisfaits de la Lumbre Edison, qui donno à l'éclairage de la Poudrorie une spourité inconnue justu'ici.

Пенинсов

Deux installations comprenant ensemble 110 lampes, fonctionment à Besançon depuis le 9 septembre et éclairent le tunnel de la Citudelle (fong de 420 métres et large de 12), le café Granvelle, et les magasins de bronzes et objets d'art de la maison Dukois Chevaidel.

Les deux installations sont actionnées par une force hydraulique omécuntée au moulin de Taragnoz, situé eu dehors des fortifications à 95 mètres du tunnel et à 600 mètres environ de la maison Dubois Chevaidel.

mètres environ de la maison Dubois Chevnidel. Les conducteurs principaux traversent le Doubs d'un soul jet et sont fixés dans les rues sur des poteaux télégraphiques placés en bordure des trottoirs de 25 mètres en 25 mètres.

placés en bordure des trottoirs de 25 mètres en 25 mètres. Dans le tunnal, les lampes sont supportées par des tigos de fer scellées dans la voûte; la ligne des lampes est à 3 m. 60 du niveau du chemin de halago.

Les résultats sont des plus brillants; le publie Byzontin qui assistati à l'inneguration et comprenait toutes les notabilités de la ville, a marqué son approbation par des applaudissements prolongés. Les principaux joarnaux de la région, tels que: PUnion Franc-Comioise, la Démocratie, le Courrier, le Démocrate, etc., etc., ont coastaté le succès complet du système Edison.

Les ouvriers de l'industrie horlogère, et le commerce, demandeat avec instance l'installation générale du système, pour l'éclairage de la ville et des ateliers.

Bordemix.

L'éclairage Edison fonctionne depus le 15 août à l'Exposition de la Société Philometique de Bordeaux; denx machines dynamo Z sont installées dans une annexe.

Uno partie de cette annexe a été meublée de la façou la plus artistique par les principales maisons d'amenblement de Bordeux; le centre de la travefe forme solo, un des obtés chambres à coucher, et l'autre cété salle à manger; le tout est éclairé brillamment par 190 lampes Edison places au est éclairé brillamment par 190 lampes Edison places au prides lustres, des appliques, des torchères et des supports

L'effet produit par les lampes incandescentes Edison fixées sor les lustres en cristal est des plus heureux et des plus agréables à l'œil.

L'annexe où fonctionne notre éclairage constitue une des principales attractions de l'Exposition de Bordeaux ; de l'avis des visiteurs, jamais éclairage n'a réuni des conditions aussi complètes de fixité, de régularité et d'élégance.

Dijon.

Une installation de 65 lampes A a été inaugurée le 9 août à Dijon, dans un local disposé pour une Exposition d'objets d'art pour ameublement, tels que bromes, étoffes, etc..., et comprenant plusieurs pièces. Un grand salon est éclairé par 8 lastres de 2 lampes chacun et 4 appliques de 1 lampe.

Des (vitrimes renfermant les objets exposés et imitant la disposition d'uno dovanture de magasin, sont celuirées par 16 lampes placées en rampo.

Uno grando salle à manger où est dressée ane table de 40 couverts est éclairée par 3 lustres de 3 lampes chacun ot 8 appliques de 4 lampe, la chambre des machines est éclairée par 5 lampes.

L'effet prodait est des plus heureux et tous les visiteurs en sont enchantés.

Le Conseil Municipal de Dijos, qui nasistait en corps à une soirée qui lui avait été exclutivement réservée, s'est montré si satisfait, qu'il a autorisé la pose des cébles dans les rues de la ville, pour l'établissement des stations ceutrales.

Perpignan.

La nouvelle et importante usine de MM. Joseph Bardou et fils, fabricants de papiers à eigarettes, est éclairée depuis le 20 septembre par le système Editson; la machine dynamo Z est actionnée par le même moteur à vapeur qui fournit la force à toute l'usine.

MM. Joseph Bardou et fils nous écrivent comme suit à ce sujet :

« Nous avons 58 lampes A qui éclairent d'uao seçon ndmirable nos ateliers, salle de machines, salle de chaudières, machines à couper le papier, laminoirs, ascenseur, machines et presses llithographiques, ateliers de manipulation du papier a digarches, cartonançes, ateliers de forge et ajustage, nos bureaux, en un mot toute notre tusine.

« Tous nos ouvriers sont enchantés de est éclairage qui « leur permet de rapprocher les lampes de leur travail, sans do carbono, sulfuroux ou carbonique.
Avess avous en outro l'arnatago, quand nos maobines (Hibagruphiques tirent certaines couleurs Jauna d'or d'autres qui ne so voicest pas au gaz, do pouvoir corriger notre travail et règler l'energe. Bufin nous sommes entiferement satisfaits de notro innovation, et uous vous en adressons non melliques (Mélations.)

Allemagne

Berlin. — Uue installatiou dans lo Bohmisches Brauhaus (brasserie bohémicane) a donné des résultats superbes. L'installation, que nous avions placé d'abord à titre d'essal est maintenant définitive, et tout le moude, le patron aussi bien que les ouvriers, est enchanté de notre lumière.

Voici în lettre quo nous avens reçue à ce sujet :

 Nous pouvons vous faire part des remarques suivantes faites sur les essais d'éclairace à l'aide du système Edison.

Nous avons employé la lumière électrique dans les aires do Malt, dans les ceres do fermeutation et dans lo dépôt of nous nous somes sevris suparavat du guz et de bongies de Stéarine; du gaz dans les corridors seulement, parce que lo gaz chaufferait trop dans les caves do fermentation et do dépôt.

Dans les chambros do Malt par exemple, la plus petite quantité de gaz influe d'une manière tout à fait nuisible sur - 11 -

le développement du Malt, et ceoi abstruction faite de l'écliaussement et du desséchement de l'air produits par les finmmes de gaz.

Tous ces ennuis sont absolument supprimés par l'emplei de la lumière électrique.

Le développement de la chalcur est si petit que l'en ne peut pas constator d'élévation de température au thermo-

Dans la Malterie il ne faut que peu de lampes pour éclairer de grands espaces, olles n'ent même pas besoin de brûler à pleine intensité parce que les plafonds recouverts de binne renvolont les rayons de lumière.

La lumière électrique se montre tout à fait avantagense dans les eaves de fermontation et de dépôt.

En dehors de l'installation dans la Malterie nons employens des lampes fines et mobiles qui nous permettent d'accomplir des travnax tels que le lavage des œuves, le transvasement des grands tonneaux dans les fûts.

Nons n'avons pas encore pa faire de calcul nu point do vue de l'économie; cependant nous ne doutous nullement que octet lumière, grâce à son peu de chalcur et à as sécurité par rapport à l'incendie, ne remplace sous peu in lumière employeò jusqu'iei dans les brasseries, c'est-d-iire lo gaz et la lumière si endiesse des boucies. »

Berlin, le 6 soût 1882.

Une installation a été faite à Berlin également dans l'imprimerie de M. Buxenstein. Elle fonctionne parfaitement et le propriétaire a ndressé à netre représentant une lettre dont nous extrayons le passage saivant:

« L'échlimge fonctionne depais le 12 avril. Tens les avantages que vous m'avez promis précédemment sur co système se sont parfaitement réalisés. » Munich, Exposition. — L'Exposition électrique an Munich, Exposition. — L'Exposition électrique na Palair de Cristia de Munich a été ouvrete le 16 septembre on non société a remporte en virticalor temple. Non a result cidario le taléstre, par estament, publicate, par estament, portament estament, par estament,

a Nous outrous maintenant au théitre, éclairé par le systeme Edison. Cest jusqu'à présent la great altraresson de l'Exposition. La stabilité de la lumière et sa couleur donc produisent au charmant effet, et sont paraître les viasges et les cestimes baucoup plus frais par l'épairage. Il faut dipotra de ces avantages l'absence de tout danger et de la chaleur. »

Cuirussé Chinois. — Le gonvernement chinois, qui fait construiro on ce moment à Stattin nn enivassé, a suivi l'exemple donné par les Américains et les Russes en adoptaut des lampes Edisen pour éclairer ce bâtiment. On voit - 13 -

que Messiours les Chinels aiment le progrès et devancent même quelquefois des nations civilisées,

Dreade. — La grande manufacture de planes de M. Aschierberg sora entiétrement échirée par notre lumière. Un dynamo K (260 lampes A), ainsi que les lampes, desilles et autres accessoires sont déjlá sur place, et notre usine d'Irrysur-Soine termine en co moment les lustres, les suspensions, les appliques, de

Ahten. — Une mino do strontismito va étro éclairée par nos lampes. C'est la première fois qu'on so servim de l'élocticlés pour éclairer une mine; ect escasi sora dono du plus grandi intérêt. Le matériel nécessaire (une installation de 60 lampes A) vient d'être expédié, et nous nous proposess de pablire un rapport très déclaire sur ces expériences.

Poesneck. — Une installation de 60 lampes A éclaire une partie de la graude manufacture de MM. Fischer et Seige, qui sont enchantés de la belle l'umière et qui ent fait les plus grands éloges à notre représentant.

Sarrequemines. — Dans los grandes et importantes faleacaries do M. Utaschneider fonctionne, depuis plusieurs mois, mane installation de 60 hmpes A. Les résultats ont été tellement satisfaisants et concluants que nous sommes en co momient en pourparlers pour la formation d'uno station centralo à Sarrequemines.

Strassburg. Gare. — Uno installation do 60 lampes fonctionno à la garo do Strasbourg depuis le commencement du mois do jauvior. La daute moyenno de toutes les lampes est de mille henres, mais il y en a quelques-unes qui ont atteint, dans oo moment, ane durée de plus de deux mille heures.

Lo rèsultat était tellement satisfaisant que la direction des elemins de fer de l'empire allemand neus a invité à lui soumettre un devis pour l'éclairace de la neuvelle station conmettre un devis pour l'éclairace de la neuvelle station contrale de Strasbourg qui doit être inangurée dans quelques mols. Cette nouvelle installation comprendra environ 1,200 lamnes.

Berlin. — Une petite station centralo va étre établie dans in Wilhelmstrasse, le quartier le plus distingué de Berlin, Le palais du prince de Bismarck, la chancellerie de l'Empire, les palais des princes Charles et Frédéric-Charles, la maison de banque Landau et autres se trouvent dans la partie de la rac qui sera éclairée par notre lumière.

Cologne-sur-Rhin. - La Gazetto de Cologne (Coinische Zeitung) a commandé une de nos instaliations de 120 lampes pour ses bureaux et son imprimerie. Le matériel est déjà expédié. L'insfallation fonctionnera sous peu, et nous en parlerons plus longuement dans notre prochain bulletin.

Autriche-Hongrie

Vienne. - Lo plus beau et le plus grand café do Vionne, situé à côté du nouvel hôtel do ville, vient d'adopter définitivement notre système d'éclairage et de commander une installation complète de 250 lampes A, qui sera terminée au premier jour.

Buda-Pesth.—Les expériences que nous avons faites à Buda-Pest à l'Hôtel des Postes et Télégraphes nous ont valu lo

« Je soussigné certifio que M. Puskas a fait des expériences d'échirage à l'hôtel des Postes et Télégraphes au moyen do 57 lampes A et 40 lampes B à incandescence systèmo Edison, depuis lo 20 mai jusqu'au 10 juin courant, do huit heures du soir à huit heures du matin, et que ees expériences ont réussi à tous les points de vue, La lumière des lampes est douce, constanto et nullement désagréable pour - 13 -

la vuu. La chalcur produite par ces immpes est absolument nulle. C'est pour toutes ces raisous quo ce système d'éclairago a obtenu l'approbation unanime de la Direction et du tout le personnel, .

Buda-Pesth, 20 juin 1882.

Signd: Louis KOLLER.

Consollier ministérial at Directour en clué du Département des Télègraphes.

Steyr. - Lo succès qu'a obteuu notre installation do 60 lampes fuito à titre d'essai dans la graudo fabriquo d'armes de M. Werudi (Oesforreichische Waffenfabrieks Actiongosellschaft) a décidé son gendre, M. le comto Lumberg, à belairer sou château do Trautonfels par notre systèmo. L'installation est terminée et fonctionne à morveille. M. Werndl a outamé uvec uous des pourparlers pour delairer touto sa fabriquo aveo nos lampos, et nous a fait aunoueer qu'il vicudra à Paris sous pou pour mener à bonne flu ces pourparlers. 11 s'agit d'une installation de 4,000 lampes.

Brunn. - Le grand théatre de la ville de Brunu, qui est en construction, va ouvrir lo 31 octobro et sera cutièrement éclairé par nos lampes. Plus do 800 lampes A, actionnées par quatro dynamos de 250 lampes chaeuu sont installées. C'est lo premier grand théatre sur le coutinent qui a adopté uotre systèmo à l'exclusiou de tout autre modo d'delairage ot uous uous proposons d'en reparler dans netro prochain

La villo nous a donnú en mêmo temps l'autorisation pour la pose des fils ot des conducteurs dans les rues, et nous sonnes occupés à établir une statiou ceutrale, qui éclairera des usines, cafés, clubs et maisons particulières.

Bologne. — Le nouveau moulin à vapeur de MM. Franco et Cavelleri est éclaire par notre lumière. Une lettre, que nous avons reque récomment, dit entre autres de cette installation, de 60 lampes A, qu'elle « a toujours fonctionné à « merveille depuis le premier jour. »

Milan. — Qualra grandar machine-dynamo do 4,200 importa challengo de alexano, estudio goru la premior station centrale dans costs with post parties of New York, et probablement importa challengo de la New York, et probablement de la station commence A functionament. Zilo éclarieva hibidro de la Stalla, centrale partie de la station commence A functionament. Zilo éclarieva hibidro de la Stalla, deux ce trois autre tablette, de magasina de correla, ramaion correla, ramaion productiva, de la Carlo de la Stalla, deux ce trois autre tablette, de magasina de la correla, ramaion productiva, de la contrale de la Stalla, deux ce trois autre tablette, de magasina de la Stalla deux ce trois autre tablette, de magasina de la finale de la station contrale de premier district. Lo plumpari de l'Stote de Milan di dans son autrende de la station contrale de premier district. Lo plumpari de l'Stote de Milan di dans son autrende de la station contrale de premier district. Lo plumpari de l'Stote de Milan di dans son autrende de l'apprende de l'apprende de la station contrale de premier district. Lo plumpari de l'apprende de la station contrale de premier district. Lo magasine de la station contrale de premier district. Lo magasine de la station contrale de premier district. Lo magasine de la station contrale de premier district. Lo magasine de la station contrale de la station

La tuntifer destrique à la Seala.— Comitato per le applicazioni dell' Electricia e Spatema Edicion » in Italia a propost à la Villo d'échiere la sedue de la Seala pendata la salon 1882-1883 et plus tard unest la salle. Il est superfie l'institer sur l'utilis indiventable de l'échiarge applications de la number Edicion, doubent plus qu'il s'agit d'applications de la number Edicion, doubent plus qu'il s'agit d'applications de la number Edicion, douben el sessais ont toujours été occurona par le seude le plus innostratable ot le plus innostraté. Il ne pert y avoir auneu doute que notre Cossell municipal no s'empresse d'accepter la proposition qui lui out faite de deber notre permise reside no blemitat de la lamitée destrique.

Udine. - Nous avons fait à Udine une installation à titre d'essai, parce que cotto ville a l'intention d'adopter

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notre système pour éclairer tant les voies publiques que les maisons particulières. Nous reproduisons un article para dans le journal d'Udine du 7 août.

Lo presince canal do l'amière delectique (Bilano) qui at tèté fait a culle luis resi d'una in a Logia est aux « Alvesais et a mis et aux si devais et a culture de la commentation de la commentation de la commentation de la composita de la composita de la public avec loquello tottes les lampes so sont all'amiere, stréageant en pen d'instants in maximum d'intensit, a fevreundement firresconde la public des l'aberd. La lumbre a des l'aberd des commentations de la commentation de l'aberd de l'aberd. La lumbre a le commentation de la public de l'aberd. La lumbre a le commentation de la public de l'aberd. La lumbre a l'aberd de l'aberd avantage à la lumbre de l'aberd d

A ces avantages assoz importents dijà en joiguent d'autres encore tels que la facilité de transmer les l'unifiere en un point quelenque au moyen de simples fils métalliques et la suppression de tout danger d'incensile, en sorto qu'ille et l'emperins de supposer que le jour of l'on sera mis en demeure de oboisir entro la lumière déctrique et le gaz, la victoire sera remportée par la première.

ladauc.

Anuers. — M. de Wael, bourgmestre de la ville d'Anvers, nous a adressé le certifient et-dessous relatif aux essais fuits par nous à l'Hôtel de Ville d'Anvers.

« Le Bourgmestre de la ville d'Anvers déclare que deux cisais d'éclairage, au moyen de la lumière électrique (système Bálson), ont été faits dans la salle de réunion du Consell communal et que ose essais ent donné des résultats très satisfaisants. »

Anvers, le 2 acût 1882. Signé : Léovold de WAEL.

MM. Gits Segers Cis ont éclairé leur grande raffinorie

de suero par une installation de 60 lampes A depuis le 28 avril. Ils nous ont, à la suite des expériences faites avec cette installation, exprime le désir d'éclairer toute la fabrique, et nous ne doutous pas que les pourpariers nboutiront bientôt.

Bruxelles. — L'Installation que nous avons faite au musée du Nord a intéressé vivement tous les industriels bélges, qui viennent de toutes les parties du pays pour la voir. Tout le monde est enchanté et nous recevous sans cesso des demandes.

Les huit installations suivantes sont en train d'être installées par nos ingénieurs et de nombreux pourparlers sont entamés depuis quelques jours :

MM. Desmet et Dhanis, Gand, 60 Lampes A.

MM. Snyers, Beaudouin O* . 30 lampes B.

Charbonnages d'Aiseau Présles . 35 — B.

Charbonnages du Boubier h

Châtelet. 60 — A.

MM. Godin et fils 420 — B.

Sceiété La Lys, Gand 40 — A. et 40 B.

M. Ivan Simonis, Verviers. . 60 lampes A. MM. Beliard et Best, Anvers. 34 — B.

La Flandre libérale, un des plus Importants journaux de la Belgique, dit dans son numéro du 26 septembre à propos de la première de cos installations.

Nous avens assisté ce soir aux premiers essais d'éclairage À la lumière électrique qui se sont faits à Ganiq c'est à la fibrique de MM. Desmet et Dhanis, rou saux Lainces, qu'its ont ou lleu. Ces messicurs ont fait installer dans leur fabrique une machine dyname-électrique allimentant 60 lampes système Edison, qui éclairent maintenant une partie de l'établissemes de

Gui premiera essaie cui dipassa fonte attente; la lumiter Con premiera essaie cui dipassa fonte attente la constitución de la premiera basescon plas considerable que celaciamente par lugar basescon plas considerable que celadenade par lugar personal de la constitución de la constitución de la constitución de la constitución de produst preque pas de cidamente, con propulsarios de la produst preque pas de cidamente, con propulsarios del produsta preque pas de cidamente, con production de la productión para la constitución de la constitución de partenes descripcion en la hamiero dura partenes de partenes para la constitución por la la parte de partenes de la constitución de la constitución de la constitución del partenes de la constitución de

Non-motive cent ringpain. Are tous ses accessives, que Maria de Maria de Paris, est venn installer class and principal de Maria d

MM. Desmet et Dhanis sont entièrement satisfaits de

l'expérience qu'ils viennent de tenter; tous œux qui y ent assisté étaient unanimes à dire qu'elle étnit décisive. Le neuveau mode d'éclairage est excessivement simple et fneile; Il neus n para aussi présenter de très sérieux avantages na point de vue des dangers d'incendie.

Nous apprenons que des lampes Edison viennent égaloment d'étre installées à la fabrique la Lys. Comme en le voit, nos cenciteyens s'empressent de mettre à profit les dernières découvertes de la science,

Tamorsfors (Finlande). — MM. Finlayson et C*, propriédaires d'une filature des plus importantes, ont fait der essais avec notre éclaimge qui ont en un résultat tellement satisfaisant que ced Mes-ieurs nous ent commande une grande installation de 1000 lampes B et [120 lampes A. Nos ingétious met.

niours sont en ce moment occupés à terminer les travaux.

La grande fabrique de prapier Angovois an nord de la Finlande vient d'adopter notre système d'échirunge en nous commandant une installation de 60 lampes A.

Helsingfors. — La papeterie Vaden vient d'adopter notre système d'éclairage, et le matériel, pour une première installation de 120 lampes B, a été envoyé.

La grando usino Nobel est telairée, depnis lo 1^{er} févrior, par 150 de nos lampes A. M. Nobel a exprimé, à notre représentant, son entière satisfaction et recommande parlout notre système d'éclairage de la façon la plus chaude.

Le thédiro Arcadia est éclairé depais lo 4" juin, par 140 lampes A. A l'occasion du bénédico de la première chantouse, notre représentant lui a offert un bouquet dans tepus so trouvail, entourée de roses, une lampe incandessente. Il est impossible de se faire une idée de l'entheusiame du public qui veulnit, à toute facre, voir M. Edison, Moscou. — Une installation de seixants impres A foscou, lenna depuis les "pin na ur Tübiter Demiliage a Marcia, cel le propriétaire on est aussi satisfait que le public. Cest on offet un grand avantage pour les tibiters d'avoir un éclairage qui ne développe plus de challeur et qui penne de la la commentation de la commentation de la commentation saints au directour de faire de sa filières minue en plem été. Sans parler du danger d'incendie, qui est absolument écarté nar poles retrième.

Bogorodsk, pres dioseout. — MM. Hutcheson et C*, filatours, ont imité l'exemple donné par la grande filature Finlayson et C*, de Tamersiors, en adoptant netre système. Un de uos ingéuieurs s'est readu à Dogorodsk pour placer une installation de 390 kampes A.

Nigni-Nougorod. — Le Théatre de M. Lentorsky est éclairé par 60 lampes A Edison dopuis le 10 juin et tout le monde est unanime à louer notre lumière.

La Compaguio des bateaux à vapeur Kaukaso et Morcure vient d'adopter noire système. Nous avons fait une installation de 120 lampes B. qui fonctionne depuis le 1^{ez} août à bord du steamer Grand-Duc Souveroff et nous sommes en pourparlers pour les autres bateaux de la dite Compagnie.

Taganroh. — M. Alferaky a fait iastaller dans soa moulin à vapeur 60 de nos lampes A. II a dit à notre representant qu'il est très satisfait de notre lumière, qui est briliante et suncribe et dont le prix de revient est minime.

Kieff. — Nons sommes en train de faire installer 60 lampes B et 30 lampes A dans la gare du chemin de fer de Karkok-Kieff qui fonctionneront sous peu.

Varsovic. — Une de nos petites installations (B de 47 lampés A ou 34 lampes B) va être faite à Varsovie, peur servir à dos expériences et des démonstrations publiques.

Hollonda

Amuseran. — La Neelechmische Riestrieiteits Mathchappy (Soeldt Nurselechmische Erzeitrieit) vient des constitions (Bernard et al. 1998). In the second of the second tors: Elle capille de 1998 per la principal de 1998 per la une installation de 00 lampus per la principal de 1998 per la l'Amuseran (ceté Kranspoule 1998 per la seriale compte de d'Amuseran (ceté Kranspoule 1998 per la principal de 1998 per la Amuseran (ceté Kranspoule 1998 per la principal de 1998 pe

Comment pourrions-nous torminer ce bulletin sans parier, quodiquo est reversate en debore do natre rayon d'activité do l'appérience de l'activité de l'appérience de la gratience de la gration contrate échirant lo premier siterité de cette ville a été insuguerte par l'homene deminent auquei nous pra-nous dépt unit d'inventions mirenuleures et qui nous pranont couch parier surprience. Es publicait les déstis men contrate voir nous inclinos devant M. Editon et nous le sementence dout de los qu'il process d'il hommatif.

La station centralo de Peens Street a été éclifre dans la nuit du 6 au 7 septembre sur six millo do conducteurs de rues comprenant cent immeubles, avec trois à cent l'ampse chacun, dans toutes les directions autour de la station jusqu'à un kilmefre de distance. Dix a vingt immeubles sont ajoutés chaque jour. Tous les shounés ent leur jusqu'à un kilmetre de distance.

et nuit sans interruption; beaucoup d'abonnés ent déjà fait enlever leurs compteurs à gaz; ils paient le même prix que pour le gaz. Voici quelques extraits de journeux;

Hérald: Lans les bureaux et magnsins il y avait la nuit dernière une lumière inaccoutumée; c'était la lampe incandessente Edison qui fonctionnait pour la première fois pour l'éclairage du premier district; l'effet était éminemment satisfaisant, le fer à cheval lumineux a bien travaillé,

Le Times : Les Gynname gionats out commond à marchar A tout houvest lus confineront toujour à mois arVêter artiète se un tremblement de terre. La lumére est plus hellintes que le gene est enté sipa les faces Niglacquel, lungue des disparages dans son sulles de la réduction et vinçi-des dans les dépendances reduciées sub leuraux amis doirs qu'en plus pour est aux sessum reflet déphisiant. La lumífere est faile qu'un homme pout revuilles é a son sies poudant plusieurs leurare sans s'aperceroie puelle des tartifiédéle. Cette lumière et donce et agradèles l'estif giles et stars vaillement et sans chaleur. Elle a 646 essayé la nuit dernière par des hommes deut le yeur ét éfacte à lumière puis des contra puter étaites à lumière par des hommes dont les yeurs étaites à lumière par des hommes dont les yeurs étaites à lumière par des hommes dont les yeurs étaites à lumière par les hommes dont les yeurs étaites à lumière par les hommes dont les yeurs étaites à lumière par les hommes deute de la lumipe de la contra le part de la lumipe délision courte le gaz.

Le Sun dit : Les lucreaux de Drexel, Morgan et C^{*} du New-York Times, de la Park Band et de New-York Times (est la Park Band et de New-York Times (est la Park Band et de New-York Times de la tente supplier ; Daiscompili tout en quo l'ai promis, maisja n'étais pas sans appréciencia foraque yalf falt marchet le madiniere e soit. N'al proque oration que quelque phénomère imprévu ne viul contrairer mon échoires, mais il a cellément résuit do no sono demande plas de huntiere que nous ries pouveus formiré, vu 1 le manque d'hennes expérimentés pour la pour de condraine, par le production de la condraire de la contraire d

Lo World dit: La plugat des principans magnales de Pulton Street et d'autres enderlis du district étaient étaient étaient de la plugation de la commandation de la co pervent etre attumées et cécintes à volonté saas le moindre danger. On peut appliquer le plus fin mouchoir autour de la lampe, casser la lampo avec un marteau, le mouchoir ne sorn pas même roussi.

De nouvelles dépêches nous informent que sur 1,500 abonnés au gaz que comptait le promier district de New-York, 1,100 se sout déjà fait inscrire à la station centrale Edison. C21,309 1883-02-15 No 2. CHAS. BATCHELON.

Paris, 18 Février 1883.

Compagnie Continentale Edison

SOCIÉTÉ ANONYME AU CAPITAL DE UN MINION DE PRANCE

PARIS. - 33, Avenue de l'Opéra. - PARIS

ÉCLAIRAGE

PAR STATIONS CENTRALES

VILLES, RUES, ÉDIFICES PUBLICS & PARTICULIERS,

Châteaux, Magasins,

THÉATRES, USINES, HUSÉES, HOPITAUX, CAPÉS, ETC.

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GEORGES LEBEY

ELIE LÉON THÉODORI PUSKAS LÉON RENAULT

Halandara and the Salandara control of

- º - . TROISIÈME BULLETIN

Première station centrale de New-York

Dama poter describes builders, daté de 10 octore, nour rous annouel l'imageration, à la tiet de 4 apsimitéry procédant, soit la première station contrale de New-York. Damaios que estre station contrale de New-York. Damaios que estre station estrale a fonciémant de Beilin spart sont, al, Prever, consul pinéral de 1880-1816 à Beilin, a tidigraphi à SM. Otheru, important du comité des Compaguies d'assurances à New-York, pour di demander des reuseignements sur le fonciémentent de cette station entrale ; nous témons di-activité introduction de l'inspection d'une sont demande de l'armost consultations de l'inspection d'une sont demande de l'armost most demande de l'inspection d'une sont demande de l'armost de l'inspection d'une sont des l'inspection d'une sont de l'inspection d'une sont d'une sont d'une sont de l'inspection d'une sont de l'inspection d'une sont d'une sont d'une sont d'une sont d'une sont d'une son

TELEGRAMME

A Monsieur S. G. Brewer, Consul Général des Étais-Unis à Berlin.

New-York, le 24 novembre 1882.

n En réponte à ves questions per calèté, ja vena informe que la Comapquille Ellicion, de cette l'unit, a a sectellement Ellicion, de cette l'unit, a a testellement per l'appendie d'Austrances de l'accident per au station con-tend., 3 for ai a toute examinée a d'acception, et le Comité de Compagnies d'Austrances de New-York à donné des certificats pour ce minera. Ellies sont installe des autres de l'acception de l'acception de l'acception de la comme de la comme de l'acception de la la l'acception de l'acception

nécessaire l'emploi de 4 dynames. La Station Centrale ne s'est pas arrêtée un soul instant jour et nuit depuis qu'elle a commencé à fonctionner le 4 soptembre, :

e Signé : R. S. Osnorn. n

Dopuis l'envoi de ce tèlégrammo M. le Major Eaton, président de la Compagnie Electrique Edison des Etats-Unis, nous a tèlégraphiè:

« La Station obtient un parfait succès: la marche n'a jumis été intercompus depuis l'inauguntilon du A septombrey; nous échirous maintenant 227 maisons dans lesquelles les conducteurs sent pects pour plus de 5.000 lampes; les cilents sont satisfaits de la lumière et du prix nuque el les leur est vendue. »

Comme cemplément à cette dépêche nous ajoutons les renseignements suivants qui neus sont parvenus officiellement de la Compagnie Edison de New-York;

«Tous les sheemès de la Sistica Contrale de M. Sistica, de New-York, out de la questionnise par la Compagnia sur imme spinien as sujet de la innière Sistica. Tous ent réponin, sans corplien, quas accellent, que a moulement li se o técnie très contents, mais mème qu'ils se pourractie plus s'un passer. Certainne personne, facult de l'achierque électrique pour a fait d'une la brait que personne, facult de l'achierque électrique les brait que d'installate des condenieurs n'était pas pariétie de la brait que d'installate de condenieurs d'était pas pariétie de les deux de l'achierque des crédit de l'achierque de l'achier

Les machines pour l'éclairage de la douxième partie du réseau sont en cours d'installation dans la Station centrale de Pearl Street; l'achèvement de ce travail permottra d'actienner plus de 15.000 iampes dout les cenducteurs sont dèlà posés.

Deuxième station centrale de New-York.

On receit en ee mement les souscriptions pour la douxième Station centrale de la ville de New-York, et les travaux dejvent commoncer au printemps. Nous avons reçu le rapport du Consell d'Administration qui a été présenté à la promière Assemblée Générale des nectionnaires de la Compagnie Américaine des installations isolées qui a ou lieu le 21 novembre 1882.

Cotto Compagnio est formée au espítal de 2.800.000 francs, dont 81 0/0, seit 1.975.000 francs en actions complètement libérées out été versés à la Compagnio méro, comme prix de la license des brovets, laisant un capitul en numéraire de 1.925.000 francs.

Le premier exercice a produit uu bénéfice net de 290,738 fr., permettant de distribuer un dividende de dix pour cent sur tout le capital-actions et de constituer de plus une réserve.

to capital-actions of the constituer do plus une réserve.

Les affairsado octée Compagnio, jauyu'au 19 novembre 1882,
ont porté sur 437 fustallations isolèes d'uno importance variant de 15 à 800 lampes chacuue. Ces installations ont été
faites dans des filatures, usiues, hôtels, baicaux à vaneur,

bureaux de journnux, magusins de nouveautés, etc., etc. Le nombre total des lampes employées dans ces installations est de 25,426.

Les offices de journaux éclairès par des installations Edison sont : le New-Fork Heratd, le Philadelphia Leedger, le Philadelphia Record, le Ohio State Journal, le Doston Heratd, le Baltimors San, le Davemport Gazelle aiusi que l'imprimerio et les bureaux de M.M. Weed, Parsons et Cie à Albany.

Pour toutes les parties du travail que comporte l'impression des journaux, la lumière Edison a été reconnue comme constituant un précieux moyen d'échirarge artificiel à cause de sa fixilé et purce qu'elle no dégage aucune chalour. Notre lumière parait donner satisfaction à tous les clients,

our on n recu d'eux un nombre considérable de témoigrages qui tous proclament les mérites incontestables de la lumière Edison,

La meilleure preuvu de cette satisfactiou est fournie par lo fuit qu'aucune des installations faites à l'essai n'a été abandonnée, mais qu'au contraire beaucoup ont été agrandies. - 5 -

water the state of the second control of the

Le directeur des Wamsutta Mills écrivant à un journal nméricain, donne les ronselgnements suivants sur le système d'éclairage Edison qui fonctionne dans cette fabrique;

« L'installation n coûté environ 00,000 fr. Elle est composée de 3 dynnmos K., alimentant chacun 250 lampes de a 10 bougies. Une soule lampe delaire 4 métiers et donne une

lumière égale à chacun d'oux. Dans les autres parties
 de la fabrique l'arrangement est tel qu'ane lampe éclairo

» l'espace précèdemment éclairé par 2 bees de gaz brûlant

4 pleds cubes par heure. Depuis le premier essai, tout a
 marché parfaitement. La lumière électrique Edison est

aussi bon marché que le gaz, à 5 fr. les 1,000 pieds cubes;
 de plus, cette lumière ne produit ni fumée, ni ehaleur;

e clle est beaucoup moins dangerouse quo le guz et no vicie pas l'air. Les dynamos sont surveilles par un des mécani-

ciens de l'usine et n'exigent quo très peu de soins. La force
 motrico nécessaire est évaluée à un cheval-vapeur pour
 8,0 lampes de 10 bougies chacune.

Si la force motrico est priso sur une machine existaut
 dejà dans une usine, les frais d'exploitation de l'installation

 èlectrique sont insignifiants.
 Les frais d'éclairuge électrique de notre fabrique, qui contient 1,072 métiers de 40 pouces chacun et 50,000
 bobines, sont évalués, par au, à fr. 8,430, y compris l'in-

» térêt et l'amortissement de l'installution.

INSTALLATIONS EN EUROPE

France

Paris. — A l'époque de la publication de notre deuxième bulletin, nous n'avions, à Paris, qu'une soule installation, celle de la gere St-Lazarne où deux de nos dynames Z. actionnent 115 lampes A. et 4 B. éclairant la rotondu de St-Gormaln, les guichets des lignes de Normandie, divers bureaux et les quais des Messagories de grando vitesso; cetto lastallation fouctionne depuis le 9 septembre 1882 saus interruption et à la satisfaction générale,

Depuis, nous avons fait, à Paris, les installations suivantes :

Magashis du Bon Marché

Deux machines K. de 250 lampes A. oluacano, soit, 500 foyers, placés dans les sous-sols et dans divers rayons du rez-de-chaussio.

Les lampes destinées à l'éclairage du sous-sol, où elles brûlant 12 houres par jour, sont adaptées directement contre le plafond.

Cetto disposition, qui serait absolument impossiblo à appliquer avec tout auteo modo d'éclariage, est très avantageuse dans l'espèce, où il s'agit d'éviter d'accrocher les appareils d'éclairage ca manipulant des ballots do marchandises.

Dans les magasias du rez-de-chaussée, les lampes sont placées par groupes do 3, 4 et 6 sur les appareils à gaz existants.

Banque de France.

IMPRIMERIN DES DELLETS

Installation faite sur l'initiative de M. Ermel, Ingénieur en chef de la fabrication des billets.

Eclairage par 20 lampos A. et 64 lampes B. do la sallo de l'Imprimerie et des salles do comptago des billets.

Dans oes demières salles, qui ne reçoirent qu'un mauvais jour, lo gaz restait allumé pendant une partie do ln journée et la température était done souvent très élevée 30° le soir); depais l'emploi du système Edison elle no s'èlève plus qu'à 18° en moyeane et l'atmosphère est sensiblement assaini.

- 7 --Consell Municipal

Nous éclairons, nu Pavillon de Flore, la sallo de commissions nº 0, et l'Imperimerio municipale, au moyen d'un dyname Z. et de 00 l'ampes A.; nous arons fait une soumission pour l'éclairago de la sallo des séances du Conseil Municipal.

Loddé III4 fulricent de pluncuux, rue Stephense

1 machine Z. 48 kmpes A. ot 14 B.

Eclairage industriel des salles do vérification des plumes, do tours à bois, etc.; depuis que notre éclairage existe, en arrive à trier les nuanese des plumes à la lumière.

Pochet, verrerie, Qual Valuy

Eclairage par uno machino E. 6 lampes A. ot 26 B. Atollors de mécanique et d'émorisage des flacons.

Magasins du Louvro

1 machine Z. 60 kmpes A.

Eclalrage de differents burcanx pendant touto la journée.

Dans ces pièces, très basses, il règnait une température insupportable. Les employés sont dono très satisfaits de l'emple du système Edison.

Lature et C*, rue de Fleurus Imprimerte 1 machino Z. 60 lampes A. éclairant des machines à journaux, des salles de pliage, etc.

Hachette et Ci , rue Stanislas

Belairago nvec 78 lampes B. et 22 lampes A. de magasins et de salles de reliure, par une muchino Z.

Hôtel Continental

Eclairago du restaurant par 1 machine Z., 60 lampes A., réparties sur 3 lustres. On remarquera le nombre déjà considérable d'imprimerles éclairées par le système Edison; le Gutenberg Journal a publlé à ce sujet un intéressant article dans son numére du 30 janvier 4883, nous en elterons les passages suivunts :

ECLAIRAGE DES INFRINCILES

Dans notre numéro du 40 décembre nous avons entretenu nos lecteurs de l'éclairage électrique appliqué aux théâtres; aujourd'hui nous parlerons de l'application du même éclairage aux imprincries.

Dans ce genre d'industrie la lumlère joue un rôle très important.

En effot, depuis longtomps déjà la lumière du gaz est reconnue insuffisante, surtout pour les travaux de composition.

Différents essais ent été tentés en vue de remplacer le gaz par la lampe à are veltaïque; mais les résultats obtenus n'ent pas été satisfaisants à cause des ombres que projette cotte lumière.

La lumière électrique par incandescence Edison paraît, nu centraire, remplir toutes les conditions désirables pour ce genre d'éclairage.

Plusienrs imprimeries importantes l'ont déjà adeptée. Neus citerens entre autres:

L'imprimerie municipale de la ville de Paris, dans laquelle chaque compesiteur a, au-dessus de son rang, une lampe Edison munio d'un abat-jeur qui projette la lumière sur les casses et les éclaire d'une façon absolument uniforme.

Les marbres sent éclairés de la même façen. Les compesiteurs sent charmés de ne plus être gônés ni

par la chaleur ni par la mauvaise edear produite par le gaz. L'imprimero des billets de la Banque de Frances et galement fediaries par des lampes Ellien, Lesmachiese en blane out chacune deux Lampes l'une mentée sur un chandeller pertaiff sert au margeur l'Autre est montée sur un chandeller de la table qui recpit la feuille à marger et éclaire le recveur. Cette disposition donne les mellieurs résultats toutes les fois que les feuilles doivent être vérifiées de suite, comme

par exemple pour un timese de luxe ou pour un numérodage.

L'impérience l'aubars e algolanean duple la systaine de libra pour son nouveaux bâtiments. Les masélines à journaux not céalisées chaueu par deux lampse montées aux siège à genoeillére dont la forme vurie avec changue machine. Des genomes de la comment de l'auteur de la comment de l'auteur de la comment de l'auteur de la comment de l

La maison Hachette et Cie fait en ce moment installer le même éclairage dun ses atoliers de reliure, uiusi que dans ses magasiiss de lu rue Stanislas. Des uppareits de toutes formes éclairent les divers travaux de derure sur tranche, dorureuu balancier, et, en général, tous les travaux de l'atclière.

onamones, et. en goneras, ceas sei travata de l'atocer.
Dans les magestiss de les papiers s'emplacti jusqu'au plafond on a placé les lampes directement centre le plafond
même, la saillié totale ne dépasse pas 15 centimètres et
cetto disposition, en même temps qu'elle permet d'éclairer
toutes les étiquettes des rumes de papior, denue la plungrande
facilité de circulation aux hommes qui perfent les charges
ans appréciossou d'accreche les appareits d'éclairace

L'avautage sur tous les autres systèmes e-t évident. La lumière Edison est fixe et se vaeille pas au meindro courant d'air, elle est d'au ten doré ugrébale et d'un éciat qui no futigue pas la vue. Elle ne laisse pas, comme le gaz, sous la measce perpétuelle de l'îngendie ou de l'explosion.

On pout affirmer que c'est la lumière qui offre à la fels la sécurité la plus absolue et les conditions hygieniques les moilleures ; elle est sans rivale sous co double ropport et ne peut être comparée à aucun autre mode d'éclairage.

Installations dans les Départements.

Il nous est impossible, dans les limites que nous devens nous imposer pour ce bulletin, do donner une description décuillée de toutes les installations que nous nvons faites dans les Départements; nous devons nous berner à on donner la lités avec indications des machines et du mombre de lampse of formant la installations prious priente les personas de désirantes d'obtants des renseignements sur les avantages de notre yatéme de voulcit hon s'adraces nux propriétaires de ces installations, qui toutes fonctionnent de la mantère la plus parties et de la materia la plus parties et de plus antifications, des olterous comme exemple celle de l'occident 2º Bardon et flus, de 9 reprignant, lapres de l'occident 2º Bardon et flus, de 9 reprignant, lapres de l'occident peut de l'occident 2º Bardon et flus, de 9 reprignant, lapres de l'occident peut de 1º Bardon et flus, de 9 reprignant, lapres de l'occident peut de 1º Bardon et flus, de 1º Bardon et 1º Ba

« Nous marchons admirablement et ne cassoas plus du tout de lamnes; une rarement, nar el., nar là., »

NOMS YILLE		INDUSTRIE	DTNAMO	LANTES	
Ph. Bazin	Condé-sur- Noireau	Filaturo	1 Z ·	ŝi	32
Ch. Colliard	Au Clitean	Tissage	1.2	١.	12
Poudrerio antionnie de Saint-Chamas	1	Pondrorio	1 %	00	
Expos. de Bordeaux	Bordeaux	Exposition	2 %	120	,
J. Bardon et fils	Perpignan	Fubrique do papiers	1 Z	69	,
P. Schmitt file	Saint-Dié	Bonnoterie	1 Z.1 E	10	130
Pénal frères	Péxoune	Falencerie	1 Z	40	40
J. Luc	Namey	Munnfacture de cuirs	1 Z	60	
R. Loeffel et C *	Blainville	Filaturo	1 Z, 1 E	77	
Clorget	Veson1	Fabrique de	1 2	00	
Ed. Lefebvre	Pont-Authou	Filaturo	1.2	60	
Lepage et O.	Louviers	Pilature	1 Z	00	
L. Lefebyro	Roubaix	Filaturo	1 Z	10	60
Motte et Meillassoux	ld.	Teinturerie	1 Z	40	40
A. Laroche-Jouhert et Mottenu	Augoultme	Construct.	1 Z	€0	
P. Doudicolle fils et Gaudin ulné	Bordesux	Négocinuts	1 Z	00	
Chaveau	Toulouso	Cass	1 Z	40	40
Cli. Sabatlé	Muramet	Négogiant	i ž	00	
B. Sirven	Toulouso	Fubrique do papeterie	1 2	17	,
G. Gerbaud	Narlsonne	Negociant	12	17	

Vienne. — Nous venous d'avenir na grand d'utal bajitimes suestes. Les milations de la Cour d'Astriben, qui la jamai permis l'emploi du gar dans le pulsis impérial, nous a faiti suritér à celeirer donz grandes miles pendant les hais de al Cour. Nous avons rempisels par, diag cents de ace lampes trets mille boughe sumbjeet aprodésement à est éclaire, et à monte à des compiles. Ce qui frappait tout le monde, c'étalt surtout, a celabors de la bella ride à centre lumière. Celtif surtout, a celabors de la bella ride à centre lumière, virture des saltes éclairirées par des longues déparant l'urete des greix veru une leure du matin, la chalure dans les saltés éclairires par des longues de l'apparant l'urete des greix veru une leure du matin, la chalure dans les saltés éclairires par des l'apparant la treté de-greix veru une leure du matin, la chalure dans les saltés éclairires par des que de matin l'apparant les disparants l'apparant l'appa

Brünn. — Nous parlerons encore une fois du théâtre municipal de la capitale de la Morrelo, où le succès de notre éclairage s'accentue de jour en jour. Depais le commensement de l'éclairage, c'est-à-dire depuis plus de trois mois il n'y a pas ou la plus petitle interruption à carcejistrer. Un journal compécent écrit sur cette installation:

« Pendant que les directeurs de thétres, les municipalités et même les gouvernements de lous les pays "occupent de la question brélante de l'échirage des théatres, la capitale de la Morries, grande par l'indiligente initiative de sa multi-patité, dyar le rang qu'ello occupe dans le monde commercial initiative de sa mello entire suite de la métarde de melloyent, à l'accission de tout autre systéme, la multiere Bélson pour l'éclairage de son nouveau thébut.

Lot 4a novembro, date de l'ianuguration, fera époque dans Los danaies titédtrales, et l'imotion qu'ont ressentic ce jour-là des habitants de Brânn était bien l'ejtlime. Car maigre les études approfoudies auxquelles étet livrée la commission institude par la municipalité pour choisir le melleur système, études qui out été conduittes avec toute la sagastité et toute la complétace qu'un tel sujet comportait, ce projèr in en était pas moins considéré comme un pas des plus hardis tenté dans cette voie

Nous allons résumer en peu de mots les principaux détails de son installation

C'est à une distance de 315 mètres du théâtre que se trouve situé le bâtiment des machines occupant une superficio de 249 mètres carrés et comprenant : 1º la chambro de chauffe à vapeur et 2º la salle des machines.

Les chaudières, au nombre de trois, sont emmurées les unes à côté des autres.

Chaque chaudière est composée d'un bouilleur horizontal et d'un corps tubulaire adapté nu précèdent; dans ce deruier les tubes sont en quatre groupes; leur nombre total est do soixante-huit

Deux chaudières étant suffisantes pour l'oxploitation normale de la machine à vapeur, il y en a toujours uno en réserve. Ces chaudières, munies de tous les appareils nécessaires do chaussage et do suroté, sont alimentées par les eaux de la ville au moyen d'une pompo à vapeur fixée au mur.

Les chaudières sont timbrées pour une pression de cept atmospheres, ot c'est à cette même pression que so fait l'admission pour la machine à vapeur. Lu cheminee commune des chaudières a trente mêtres de hauteur.

Daos la salle des machines se trouvent, à côté du moteur à vapour à hauto pression d'une force de 110 chevaux, quatre muchines dynamo-electriques Edison.

La production de l'électricité dans ces machines est obtenue en faisant tourner, à raison de 900 tours à la minute, un noyau de fer doux dans lo champ d'induction.

Par co moyen, la force motrice de la machine à vapeur se change en électricité et le courant électrique, au moyen d'un cablo principal d'une lougueur de 315 mètres, est dirigé vers le théatre où s'opère sa distribution.

Chaque machino dynamo-èlectrique Edison pout alimenter 250 lampes à incandescence Edison de la force normale de seizo bougies.

- 13 -

Le câble qui relie les machines au théâtre se comp deux barres de cuivre de forme deml-ronde entourée de matières isolantes et contenues dans un tube de fer forgé qui les préserve de toute influence extérieure. En mison de lu tension minime du cournnt on peut, sans aucun danger, toucher les conducteurs; l'accouplement des tubes du câble est aussi fait d'une façon très lagéniouse,

L'intérieur du théâtre est éclairé par huit cent vingt lampes réparties dans la cage du grand esculier, le foyer, les couloirs, la salle, les loges des artistes et enfin la seine.

L'éclairage de la scène présente un intérêt tout partieulier : chaque herse supporto quatro-vingt-dix-neuf lampes, dont un tiers est destiné aux effets de lumière blanche. Un tiers est composè de lampes rouges, lo dernier tiers de lampes vertes. Tous les effets de lumière pouvent êtro ninsi facilement obtenus en allumant tout ou partie des lampes de chaque couleur. La rampe supporte cent vingt lampes établies dans les mêmes conditions.

La lumière produite sur la scèno par ces différents effets combinés est des plus heuronsos ; ello dépasso tout ce qui a èté obtenu dans ce genre jusqu'à ce jour par lo charmo inexprimable et le velouté que cette lumière donce à tous les effets de scène. A se propos nons avons à parler de l'appareil le plus ingénioux et le plus important en ce qui concerne l'éclairage de la scène et de la salle : c'est le régulateur qui est placé dans un coin de la scène : là so rassemblent tous les fils conducteurs, une véritable forêt! Le tout est symétriquement arrango et n'occupe qu'une placo relativement iasignifiante.

Grace à cet appareil, il est possible d'obtenir, tant dans la salle quo snr la scéno, dopuis la plus éclatanto clarté jusqu'à la nuit, en passant par toutes les transitions voulnes. La salle est échiréo par un lustre principal ayant doux

rangées do lampes inenudescentes.

Lo long du pourtour des loges sont installées des napliques portant chacune une lampe enfermée dans un globe dépoli. Chaque jour, des sommities de tons les pays sent attirées par l'intèrte que comporte cette inneverties et qui moitfe de semble de combie de la situation actuelle des thétieres en leur susurant in plus complète sécurit du proist de vue des dangues d'incendies j'usqu'il co jeur, octe sécurité leur a fait complétement était maigne les nombresses meures de précuration de la compléte de la

Neus parierons, dans notro prochain Bulletiu, des nutres installotions que neus sommes on troin de monter en Autriche-Hongrie et qui sont très nombreuses et très impor-

Bruxelles. — On vient de monter à titre d'essai une installation de 120 lampes A à la Chambra des députés. Le succès o été aussi grand que portout nilleurs. Nous pouvons, en effet, dire sans oxagèrer « autant d'instollations autant de succès. »

L'installation du Théâtre Royal du Paro sera terminée dons quelques jours. Nous donnerons des détoils intéressants à ce sujet dans notre bulletin N° 4.

Le nombro des usines éclairées parnotre systémo augmento de jour en jour. Ce sont survoir les filtures qui de prétences adaptent notes lumière. Le pluport des groots industriels qui ont fait à l'essai des installolions de notre lamière sont en pourparlers pour augmenter le nombro des lompes et pour éclairer estilérement leurs usines par la lampe Edison.

working a continuous remembers and a second of the continuous and a second of the continuous

Voici le passage d'une lettre de MM. E. L. Godin et fils, fabricants de papier à Huy, qui neus écrivent on date du & décembre 1882: « Neus veus informens que neus sommes » toujours très satisfaits de notre échirage Edison. »

D'un nutre côté, MM. Béllard et Best, à Anvers, nous discurir « Nous ne voulons pas attendre plus longtemps pour » vous écrire au sujet de votre célairage dont neus sommes » très satisfaits; il nous procure un très notable économie » sur nos frais d'éclairac.

. . . .

Amstardam. — Uso Station Controlo (1,000 lampes A) see torninéo ot commencera à fossionner au mois d'avril. Les dynomos sont expédiés, les machines motrices et les chaudières sont montées, et la pose des câbles va commencer dans quelques jours.

Le Café Krasnopolski, est toujours éclairé par nos lampes, qui brûlent maintenant depuis le mois de juillet 1882 à la grande satisfaction du publie et du propriétaire.

La minoterie Rayavaan est également éclairée par nous, lepuis sa mise en marche, au mois de septembre, l'éclairage fonctionne à merreille.

Même succés dans la grande raffineris de sucre « Wester Suikerraffinadery » éclairée par 360 lampes A actionnées par 2 dynamos K,

Rettordam. — Les travaux pour la Station Cantrals sont très avancés; nous espérons qu'ello pourra commencer à fonctionner en même temps quo cello d'Amsterdam.

Hennene

Strasbourg. — Nous avons parlé dons notro bulletin N°2 de l'installotien qui fenetionno à lo gars de ectto ville depuis treize mois, Quelques-unes des lampes do la première pos brûlant eucoro ent atteint octuellement une durée de plus Dresde. — L'installation dans la fabrique de plonos de M. Emile Ascherborg (250 lampes A) fonctionano maintenant depuis 2 mois. Le propriétairo de la fabriquo nous fait les plus grands éloces.

Le théatre de la Cour fait dans co moment des essais avec une petito installation de 60 lampes A, placées sur la scène. La direction a l'intention d'adopter notre système.

Munich. — L'installation de notre lumière au Théâtre Royal (Residenztheater) est presquo terminée et fosetionners sous peu. Nous sommes occupés, en ee moment, à construire le régulatur pour les offet de lumière.

truire le régulateur pour les effets do lumières.

Dès que l'éelairage aura commoncé nous en reparlerons à nos lectours

Dantzig. — Le chantier de la Marine impériale (Werft) est éclair par 120 do nos lampes A. Nous savons que les autorités allennandes sont très satisfaites des résultats. Nous ntendons un rapport détaillé concernant cette installation et nous le publicrous ultériourement.

Canstatt (Wurtemberg). — MM. S. Lindauer C*, fabricants de corsets, écrivent au sujet d'uno installation de 130 lampes B. qui fonctionno depuis quelquo mois dans

« L'éclairage installé par vous fonctionnant depuis un s certain temps maintenant, nous sommes heureux de pous voir vous confirmer que nous en sommes entièrement sa-

" tisfaits.

- 17 --

« La machino dynamo Edison fonctionne d'une façon » tout à fait régulière, et saus s'échauffer, et saus produire

 d'étincelles, Tout en faisant son service ordinaire, notre mécanicien peut la surveiller facilement, tellement la conduite en est simple.

« Le pouvoir éclairant des 130 lampes B. actuellement » placées étant tout à fait satisfaisunt, nous avons l'intention

n d'en iustaller 60 de plus. La lumière des lampes est d'uno s fixité remarquable, très agrénble pour les yeux et, qui

mieax est, nos ouvriers no sont pas gênés par la chaleur. »

« Malgré l'importance rolative des frais de premier éta» blissement, nous pouvons des à présent constates une

blissement, nous pourons des à présent constater une
 conomie notable eu comparaison do l'éclairage au gaz. »
 Caustatt, 31 jauvier 1882. »

Signé: S. LINDAUER C'

the second second second second

Nous recevons tous les jours des commandes de toutes les parties dell'Allemagne. On installe notre lumière dans presque toutes les grandes villes. La place nous manque aujourd'hui pour parler de chaque installation dans tous ses édanis, mais nous publierons bientôt un bulletin spécial des installations allemandes.

Italie.

Milan. — Nous avons dejà dit (dans le bulletin nº 23, que les quatre grands dynamos de 1200 à 1400 lampes Achaeun, deinet partis pour Milan. On est mainfonant occupé à installer les motours et les chaudières. La poss des bles soaterains est termisdo el la Statien centrale de Milan, la première sur lo continent, fonctionnera probablement lo mois prochain.

Des installations isolèes fouctionnent déjà à :

Bologne. — Chez MM. Franco et Cavalieri, moulin à

Solbiate. — Chez M. A. Pontl, filature. Vaprio. — Chez M. B. Crespi, filature.

Bergamo. - Chez M. Grespi, filature Pise. - Chez M. Ginoomo Nissim, filature. Pegli. - Chez MM. Gassanallo frèras, meulin à vapeur. Vigerami, - Chez MM. G. Grespi & G*, filature. Lac Majeur. — Chez M. A. M. Grossi, filature. Turin. - Chez M. Lemsnn et Co, filature,

Rome. - A l'Ecole des Beaux-Arts. Toutes ees installations fenetionnent admirablement depuis le premier jour.

Depuis notre dernier bulletin une grande raffinerie de eucre à Josefow (Polegne) est éclairée par 140 lampes A (2 dynamos Z et 1 dynamo E). Un grand nombre de machines dynamo-électriques sont en ce moment en route pour in Russie; mais comme nons ne voulons parler que des instal-Intions isolées déjà établies, nous neus réservons d'en parler plus tard.

La etation centrale de St-Péterebourg sera inangurée bientôt. Toutes les machines et tout le matériel électrique sont mninteanat expédiés et nos ingénieurs commencent les travaux.

Ingeroie (Russie). L'Ingénieur en chef de la Société des usines à Papier de cette ville écrit en date du 30 décembre :

- · Au nom de la Société des Papeteries d'Ingerois je tiens » à veus faire part des résultats obtenus avec l'éclairage
- » électrique que veus nvez établi à sea usine pour la pâte et
- » le carton de beis à Ingerois, dans le courant du mois de » septembre passé.
- » Cet celairage se compose d'une machine dynamo-éleco trique mise en mouvement à volonté au moyen d'une tur-
- » bine ou d'une machine à vapeur et 60 lampes, employées

- 19 -
- » dans les différentes parties de l'usine, dans les cours,
- ompteirs, écuries. Elles remplissent parfaitement leur but » et dennent une lumière très agréable pour le travail des
- " machines, le triage des cartons, ainsi que dans les sécheirs,
- où elles excinent tous risques d'incendie.
- » Nous sommes très contents de votre éclairage électrique
- qui a résolu, ponr nous, le problème d'une benne lumière » économique et en même temps exempte des dangers d'in-
- » cendie que présente le gaz ou le pêtrele. »
 - « Pétershourg, 30 décembre 1882. »

Signé: Masser.

Acquiremental and consistent and the second residence of the

Nous recevons, de plus, un certificat de la direction de la Compagnie Kaukaee et Meroure, ainsi conçu:

- « La direction de la Compagnie Kaukase et Mereure " pour la navigation à vapeur sur le seuve Volga et la mer
- » Caspienne déclare, par les présentes, que les lampes élec-
- » triques Edison installées à bord du bateau à vapour,
- » Maréchal Souvaroff, dans toutes les cabines ainsi que
- » dans la chambro des machines à vapeur, out donné une
- · lumière splendide et qu'on ne peut désirer rien de mieux
- « sous le rapport de la clarté, de la fixité et d'un confort · bien entendu. »
 - « St-Pétershourg, 31 décembre 1882 »

Signé: LA DIRECTION.

L'emménagement pour l'éclairage d'un second bateau à vapour de cette même compagnie, l'Alexandre II, est en train d'être achevé.

Madrid. — Nous 'chirrona A' Maririd l'usine de M. La-brador, construeteur de machines, L'Ingefeineu de notre Scoldis, M. Quarturas, qui a fait cette installation, a recu la visite des principsus. fonedionaniere da Ministère de la Marice Engaçolo, inside que de monebles ples surequate de la pressa. Tour les journaux de Mariri cot public les uriteles es plus déglores, et les visiteurs visaent change jour en granis contre stouler cotte première application de notre vyténeu es l'Aguesqui sous soumes en persyntères pour les insidiations de grande impertuous, deut plusieurs pour les insidiations de grande impertuous, deut plusieurs pour les insidiations de grande impertuous, deut plusieurs

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Paris, 15 Juin 1883.

Compagnie Continentale Edison

SOCIÉTÉ ANONYME AU CAPITAL DE UN MIIIION DE FRANCS

PARIS. - 33, Avenue de l'Opéra. - PARIS

ÉCLAIRAGE

PAR STATIONS CENTRALES

VILLES, RUES, ÉDIFICES PUBLICS & PARTICULIERS,

Châteaux, Magasins,

THÉATRES, USINES, MUSÉES, HOPITAUX, GAFÉS, ETG.

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MM. CHARLES BATCHELOR, administrateur.

EBOUARD LEBEY

EDOUARD LEBEY
GEORGE LEBEY
ELIE LÉON
THÉODORE PUSKAS
LÉON RENAULT

Première station centrale de New-York.

La Stalion Centralo de New-York continue à fonctionner avec un pleiu succès; depuis neuf mnis elle fournit la lumière à ses abounés, unit et junr, sans nueune interruntion.

Les demandes nouvelles so multiplient do tolle sorte que bientôl le chiffre maximum de lampes quo cette station peut alimenter sera atteint, et la directina choisit, parmi les nombrenx elients qui demandent leur inscription, ceux qui emplotevont la lumière pendant le plus grand nombro d'heuros per jour.

La deruièro liste des abonnés que nans possédions porte la date du Gavril 1883, et comprend 3/18 maisons où sout installères 3.11 l'ampres permi en abonnés nons-relevons les noms des principaux bauquiers de New-York, des grandes Compognies d'assurances et des journaux les plus importants ainsi quo de nombreux magassius de toute espèce.

Lo matériol employ, et qui a été installé sous la direction personaelle de M. Elison, a dimné toute sudisficiénce de a particlement résisté aux essuis très avères que M. Elison hia imposés, sous signalerons entre autres un des moteurs à vapeur Armigien et Sims, yant una vilesso de 300 tours à la minute, que M. Elison a fait marche sans aucumnoveruption de 10 au 27 mars 1885, soil 47 jours.

En outro ces cesais ont permis à M. Edison de rénliser de nombreux porfectionnements dont profiteront de suite les Stotions Centrales qui vont être établies en Europe.

= 3 --

La petite ville de Roselle, New-Jersey, est éclairée par une petite Station Centrale, depuis le 10 janvier 1884.

me petro ciation centrale, depuis to 10 janvier 1885.

Pour débuter ou a installé 650 lampes dont 150 dans les rues; lo courant électrique est produitpar 3 dynamos K, auxquels un quatrième sera produi ament adjoint.

Comme partout aillears la marche, dès le premier jour, a été des plus satisfaisantes, et aucune interruption ne s'est produite dans la distribution de le lumière.

Des stations centroles sont en cours d'exécution dans diverses villes des Etuts-Unis; nons en entretiendrons nos lecteurs dans nos prochains bulletins.

Éclairage des navires à vapeur par

Depuis une ausée une révolution compitée s'est produite ou Anérégue et ce Augletere pour l'échiençe des paracles de savies de phissance ; les Grandes Comagnies de Norigation et les mantaures out reconau le sécerité aire de léchirage électrique par in-andésexence; ils out abandonnée pour nouver autres concettration ou élégie en service de les melées modes d'évolérage qui out commé si souverant d'épourantailes enstateignes, il pour rois pa sabiern souverant d'épourantailes enstateignes, ils pour rois pa sabiern service échiaires par des madières aussi tangercone, que pour le partie de la métire de la métire de la matière se des la métire de la métire de la matière se saint tangercone, que postrelo ou la four de la matière se la miture de la matière de la mat

Dèjà les rapports des capitoines de navires signolont les préclens services que leur rend l'éclairage électrique Edison; nous citerons entre autres le ropport du capitaine Whittio, du rapene Américain « Carolina » abordé entre Norfolk « E Baltimoro par le vapene Anglais « Riverdoio ». Le capitaine

Whittle s'exprime on ces termes :

a Nons nvons eu ninsi la démonstration complète des immenses avantages et do la sécurité absoluo du système Edi-

sou ; en affet les lampes qui ont été brisées dans les parties du navire endommagées par le choc, se sont éténites parce seul dit, et ains oit dé écartés les dangers d'incendié qui se seraiont certainement produits si un autre mode d'échairage avait été employé ; les autres lampes ont continué à fonctionner comme auparvant. »

Les lampes Rélison présentent encore pour l'éclairage des navires un autre avantage; en effet, pouvant brûker sous freau, elles purmettent, d'une part, d'explorer la cale d'un navire où une voie d'eau se serait déclarde et qui serait déjà envalue, et, d'autre part, de faire visiter, même pendant la nuit. A l'extériour, la carèse des navires.

An sigit de l'eduzinge sou-marin, aous avans le pisisie "disformer sois lectures que l'expedition qui vient, d'étre envoyé dans les More de Sol par le Ministère de la Marine, Abord de rallaman, et qui est judice sons a direction scientifique de M. Miller Edwards, a emport un nombre considèrable de lamps Ellino, perjorate special sense luyer chie, etqui si premeterant de firer, de le grandes producters, des observations d'in gener tout nouvez, qui antienerce cetalament des découverles importantes et de plus grand intellet pour la scientifica de la plus grand la latellet pour la scientifica de la plus grand intellet pour la contra de la plus de la plus pur la plus de la plus de la plus plus de la plus de la plus plus de la plus de la plus de la plus plus de la plus plus de la plus de la plus plus

Nous n'avons pu nous procurer pour la date de publication de ce bulletin une liste complète des installations d'éclairage Edison existant à berd de navires et qui oat été faites par les Compagnies Edison, américaines, anglaises ou coloniales, mais nous en doanons et-dessous un aperça déjà important.

Navires éclairé	r par In	lumière électrique Ediso
NOM	CLASSE	PHOPRIÉTAIRES
Namouna	Yacht	Mr Janses Gordon Bennett.
Carelina	Paquebot	Bay-Line.
Columbia	***	Gregon Railway et Navigation C.
Queen of Pacific	_	
City of Worsestor	-	N. Y. et Norwich Lino
Chan-Ynea	Cairané	Gouvernement chipois.
Terewara	Paguebat	Union S. S. Co of New Zealand.
Walhera	_	
Melehen		

Rin Pardo	Paquebot .	National Brazilian S. S. C
Rie Parana	_	
Apolo	-	Compagajo la Platenso.
Minerva	-	
Pateena		Tasmonian Steam Navigation C
Clan Maoarthur	_	Clan Line.
Clan Moo. Intesh		
Adelaida	_	
Alexanéra II	Vapeur de :	rivière Cie « Kaukus Mercure »,
Marechal Sonwarest		_

Parmi les navires autsellement en centiruction qui secuti manité, de l'éculirage décritéges. Ellen ous eliteraute listifica, appartennat à une Git italians de navigation; l'Oragon, de la Gi William décis, entre Liserpool è New-Yorie, et le Takapunn de la Union S. S. Cie of New-Zenkent; su najet des décentrement avice nous literat dans la pionarent anglait à le conference marier tous literations princerate la proposition de la conference de la c

INSTALLATIONS EN EUROPE

France

Quoique la saison que nous traversons en ce moment soit peu favorable nax installations de lamière diestrique, la plupart des industries n'ayant pas besoin d'échiraçes pendant ces longues journées, nous avons traité d'importantes affaires depuis la publication de notre bulletin du 15 février deraier, voie les principales:

Don't

Nous faisons en ce momeat à l'entrepôt des vins et alcools du quai Saint-Bernard une installation d'environ 300 lampes A

Ivry-sur-Scho.

Une installation de 17 lampes A actionaces par un dyname E a été faite chez M. Lemoine, maître de forges à Ivrysor-Seine, pour l'éclairage de ses bureaux et de divers utelliers.

dordenny.

Nous avons installs 88 lampes A, actionnées par un dynamo L, dans l'importante hullerie de Messieurs Manrel et l'rom et Maroel féres; code installation sera portée ultérieurement à 150 lampes, lorsque diverses annexes de l'usine seront terminées.

иноппен.

Mondows Burbley et Birmper, propriétaires des vastes et cétôbres fairs juss de papiers d'Exonues, nous ent commande en février derne vous ent entre de la commande en février derne vous de la commande d

MM. Blauchot et Kièber, fabricents de juplers photographiques, ont aussi adopté la bumière Edisce pour lears inportantes pupelories de Rives (Beère). Ness avosa isatallé chez oux 29 lumpes A ot 36 B, netioanées par un dynamo 2; ces alessieurs nous out carginnio toute lever autifaction et manifectent l'intention d'appliquer notre système à l'éclairus de leurs untres de

Value-

La papeterie de MM. de Guérimand et Çie, à Voiron (Isère), est éclairée depuis le 28 avril au moyen de 28 lampes B et 3 A, actionnées par un dynamo E; le sucées est compel comme parfout ailleurs et MM. Guérimand et Çie nous ont transmis leurs faitétations.

On resnanyeera lo développement rapido de notre échiraçó dans les papheries: a la lunike Dálicion Olive en deli dos revalegas toda princilianos porce espaces d'industrio, qui demandil'empido de la lunike pendita todos la muit. MM. Blanchet el Mohre estimant 42,000 Franca par an Feonomico quillo refulierora dans uno seulo ustao, par suito de la soppression des delacts que caussient las limparebis tombant dans les cares de pisto à pupier et produites per l'empidi du guz et d'autress modes d'écriraça, beliante à fannos illes.

Bu outre, les papelettes disposant en getefral de forces hydrauliques, l'échiraçe de ces établissements par le système Bidion ne nécessité coume dépense couraute que le remplacement des lampes, soit moins de 0 f. 01 par horre et paramete, cest-drive nue dépense moindre que getle qu'or-casiounerait l'éclairage au gaz payé à raison de 0 f. 05 le notre cube.

loubals.

Ainsi qu'il était fuelle de le prévoir notre éclairage réalisa chaque jour de nouvenux progrès dans la région si industrielle du Nord.

Nous avons fait à Roubaix, où les usines de MM. Mette et Meillassoux ot do M. Louis Lefebrro avaient déjà adepté le systame Rélacon, unonouvelle installation chez MM. Amedée Prouvest et Cie, flateurs de laines, dont l'importaut poignage est éclaire au moyen de 150 lampes A actionnées par un dyname L.

Des affaires considérables sont ou cours de négociations pour la même ville et les environs.

Montceau-les-Mines

Une installation des plus intéressantes a été faite au Puits-Aiagny, appartenant à la Cie des mines de Blanzy. 20 lampes 18 et 8 A out été placées dans les salles des machines d'extraction, les bureaux et sous les oberalements des puits; 2 lampes A placées à 321 métres de profondour éclairent deux engagements.

MM. Charget et Cie, directeurs de la Cie des Mines de Blanzy, attachent une importance toute spéciale à cette expérience qui fait présager l'autopiton à berd édait de la lampe Edison peur l'échârisge des galeries de mines; ainsi se trouveuet définitérement écardes les risques d'expéciens de grisou, qui, chaque anuée, eauxent de si neunbreuses victimes parmi les travailleurs de saines.

anonny.

Nous venous de terminer uno installatiou de 60 lampes A actionnées, par un dynamo Z chez M. Jomaron à Annonay. M. Jomaron a adepté la lumière Edison nen sculement pour son usine, une mégisserie, mais encere pour su maison d'hubitatiea, son jardin, etc.; cotto soule installation suffirait done à démontror que la lampe à incandescence se prête aux usages les plus variés et remplace partout avaatageusement les anciens systèmes d'éclairage.

Eaux-Ronnes

Un de noi Ingénicars instilla en ou moment I/ Imapes A, uver un dyrame S e l'Hidol-de-Pruns, mui Paur-Donase. M. Taveron, le progrétaire de l'Hidol-de Olmane, mui Paur-Donase. M. Taveron, le progrétaire de l'Hidol-que de l'Images de l'Andre de Olmane; mais la force montérie des til d'apose n'étant pas sufficante, il fisit construire de nouvelles turbices où, des qu'elles servent en place, l'Institutation de l'étatinger disconstruire de l'Andre de

Conn

L'Exposition de Case qui vient de s'ouvrir le 5 juiu est outièrement échirce par notre système; nous avons installable plus de 300 lampes dans les diverses galeries et sur le cours; esté installation est des plus réussies, et M. le maire de Case nous en a témoigné teutes usatiatelles. Gréce à notre échirage, l'Exposition peut rester ouverte la mil, et la resette journalière se touve considérablement augmentés.

Nons éclairerens également l'Hôtel-de-Ville de Caen, pendant les bals donnés par M. le maire à l'occasion de l'Expesition.

.....

A l'occasion du concours de gymnastique qui a eu lieu à Angoulème le 43 et le 14 mai, nes représentants dans la Charente, Màl. A. Luprèrie, Alexandre Luroche-Joubert et Cie ont installé dans les salles de banquet et de bal de l'liètot-de-Ville, ainsi que duns des cafes avoisinants 420 lampes A notionuées par 2 dynamos Z.

Cot deliringen nété virement admiré pur tous les assistants, et tous les jouraux en ent parlé dans les termes les plus flattenrs, M. le maire d'Aagoulème a bien vouls féliciter hiM. A. Laprérie, Alexandre-Laroche-Joubert et Cle de la manière la plus vive pour le concours apporté par eux à la réussit des fêtes.

Coenne

La parfaito réussite de notre éclairage à Angoulème, coîncidant avec la crise qui s'est produite à Cognac entre les coasonmateurs de guz et la compagnio du Gaz de cette ville a amené la conclusion rapide de plusieurs affaires.

Depuis le 20 mai dernier le café du Châlet à Cognac est éclairé par 17 de nos lampes avec un dynamo E; en outre, M. Gravelles, de cette ville, nous a achet our e installation de 60 lampes A avec dynamo Z, qui va être établie dans une distillerie.

Aire-sur-PAdoms

Ju: 26 au 20 uni iteruier, uous avons iculari. Ica Arones (Airles-uuri Adour (Landed), pendant les fêtes qui y ont en lieu; uotre lumière était encore incomme daus cette région et les nombreux visitours venus des villes environmentes out det virement inferessés; les fêtes de muit out été plus animites que jamais auparavant et comme partout, nos ingénieurs que les félicitations de tous les assistants heurs ont recu les félicitations de tous les assistants de tous les missions de la comme partout.

Un des principaux journaux de Bordeaux apprécie comme suit cette installation ; « Aire-sur-Adour. — Des renseignoments nons parviennent sur les expéricaces de lumière électrique qui ent eu lleu à Airesur-Adour les samedi, dimanche, luadi et mardi derniers.

Les lampes Edison out merveillousement fonctionné peudant toute la soirée jusqu'à deux heures du matiu; pes une soule intermittonce de lumière no s'est produite et pendant près de six houres les 250 lampes Edison ont jeté sur la ville d'Aire une eletté ébbuissante.

On aous assure qu'à la suite de ces expériences si concluantes, plusicars villes de notre région sent outrées en pourpariers avec la société Edison pour leur éclairage au moyen de ce système ingénieux.

Pennana

Dans note bulletin de 15 Ferfar, nous annocioses que none éficas en perception rose le government Boggod, none éficas en perception rose le government Boggod, pour les institutions de grande les compositions de la composition de la composition de la composition de la Constitution de la Constitution de Constitution de

Nos lectours n'out pas oublis que l'année deraktre nous avons fait l'installation de la Poudrerie de Shint-Chamas, appartenant au gouvernement Prançais, et de l'arsenal de Dantzig, de l'Amirusté Allemande, Tous les gouvernements adoptent dons l'eclairage Elision, pour les établissements où sont accumulées des matières explosibles et inflammbles; c'est la meilleure pravou de la sécurité qu'il donne.

.....

Strusbourg. - Nos iecteurs savent qu'une installation type Z fonctionne à la gare de Strusbourg depuis le commancament du mais de janvier 1882. C'était la première iustallatian qua notre Saciété a faite en Europe. Ella comprenait 50 lampes A at 55 lampes B. Nous recevons à ca sujet les isformatians suivantes :

La demièra lampa (du typo B) de la pramièra pose vient d'êtra misa hors da serviea après avoir atteint la duréa da 5.800 l'aures. Cetta lampe était conservée comme un véritabla trèsar par les agents da la Direction et, si pendant un an ses rayons lumiueux avaient éclairé la public, les persannes privilégièse ôtaient à la fin senies admisses à la voir.

Boaccoup d'antres lampes ont égalemant moûtet une très lampes durés ; 1800 à 3.500 beures environ in moyena lamps durés ; 1800 à 3.500 beures. L'Impoeleur, charpé du scriege déclariage, no litu on étré d'expirènces sur la tampe de 5.500 beures ; see observations serout communiquées au mode séculifique. Nous recevrous une copie authentique de corapport et la direction de Stanbourg so propose d'environs services de composité de corapport et la direction de Stanbourg so propose d'environs une copie suches lampe de corapport et la direction de Stanbourg so propose d'environs une sur la direction de la d

La madaise dynamo (N° 23) employles poar cette installation, a fancional discussor para porte en moyenne depine inavier 1880. Sa marcha a toujoura fei partiale ch'a jamais conceisando meune interreglica d'éclimique. Uno stris de dicussion et dé faits sur cette machine et tous out été trevete très satisfaisants. Ces resultats secuel trives à la pubblicie ou même temps que le rapport sur les lampes. Après un aucele pareil il s'est que naturel que noue ayout dé chargée par la porteil de la comparie Elle de la comparie de la comparie de l'installar la institue Elloria dans la mover de gare centrale de Standauez qui sera lampente ever la fin de ce noin. Les de 1:100 lampes, maio no nombre labora une moment prés de 1:100 lampes, maio no mobine la morta de pareir la lorque toute les constructions de la nouvelle gare vernelle lorque toute les constructions de la nouvelle gare terrales.

Munioh. — Le théâtre de la cour (Residenztheater), est maintenant éclairé tous les soirs par les lampes Edison. Nous nvons dome les détails da cetta lustallatina dans le bulletes péchal (N° 4) public nu mois d'avril a qui était calcularisment consercé à l'éclairrage élestrique des thérites. Naus nous bromoss dons icl a constatar que cé clealinge a soit la constant de l'eclairrage des thérites de l'eclair de la companie de l'eclair de l'eclair de l'eclair de l'eclair a per agalement, par la système Bélinea, la grand dédaire national de Munich, un des plus beaux at des plus impartunts de l'Allement

Les travaux de cette installatian ont été dirigés par M. Seubel, ingénieur da notre société. Ca mansieur a été engagé depuis par notra société allemanda et dirigara taus les travanx au sud de l'Allemague.

Berlin, — Le nonvenu théâtre allemand (Dentsches Theater), sera éclairé par nos lampes. Le coutrat entre la Direction et la Société allemande Edison est signé.

Berlin. — Les salles du restaurant de l'Exposition hygiénique sont éclairées par 250 lampes A; le public et la presse sont unanimes à trouver incomparable cette lumière si dauce et si agrénble et qui ne développs pas la moindre chaleur,

Cologno. — Nous avom cidal; mentionné dans un de non bulletius précédunts l'installation qui finedicane dans les bareaux de la réduction et dans l'imprimerée de la c'Ouscite de Cologne. Il y dans la saité de composition 121 lampes Il et 3 lampes A; dans les attéries de reliere 10 lampes Il dans les bareaux à lampes A et 30 lampes II, dans les attériety pel lampes A et dans la chamber de la colonne de la

Neuwied. — Fabrique de tabacs de M. Jah. Pet. Schneider. Le nombre actuel des lampes (28 B) sera augmenté dans le conrant de cet été. M. Schneider est très satisfait de l'éclairago qui fonctionne régulièrement depuis le mois d'oc-

Kreuznach. — Fabrique de cuir de M. Geo Andres, (70 lampes), éclnivée par notre système depuis le mois de septembre; fonctionnement parfait.

Crofeld. — Une petité installation de 47 haupes (A et B) éclaire une partie de la teinturerie de M. H. O. Neuhaus suce, depuis le moisi d'eclobre, et tout le monde est enchanté de la lumière qui, ne modifiant ascunement les couleurs, rend aux corrières leur besogne aussi facile qu'en plein jour.

Werden. — Le Jeurnal de Dertmund dit nu sujet d'une installatien de 34 lampes B qui y fenctionne depuis plus de six meis:

- « La fabriquo de machines à coudre C. Dürrkepp et Cie à » Werden vient d'installer à titre d'essai dans la partie nou-» vellement construite de l'établissement l'éclairage électrique
- » Edisen et ces essais ent denné des résultate si satisfaisants, « qu'en va éclairer sous peu toute la fabrique par le même
- système; 34 lampes à incandescence Edison du type B sont actionnées par une potite machine dynamo-électrique.
- Les lampes sent disperées sur les différentes machines
 absolument comme les bees de gaz. Lu content de la lu-
- mière est fort deuce et zgréable.
 Ces trois dernières installations ont également été montées

Cos trois dernières installations ont également été montées sous la direction de M. Pfankuch de la maison Pfankuch et Reinhardt de Cologue.

Munioh. — Une installation de 40 lampes A et 40 lampes B feuctionne dans la brasserie de la Croix d'or de ette ville depuis plus de six mois. L'échairme deur Fégul-Aremeut tous les jours depuis 6 heures du soir jusqu'à 2 houres du matin. L'absence compilée de chaleur et la lumière si douce enchantent le public. Nous citous parmi les autres installations fenctionnant en Allemagno les suivantes :

Berlin Ressource de 1794 (cercle)	1	dynamo Z	
Rositz Fabrique de sucre	4	K	
Berlin Spicker et Cic.	1	- z	
Berlin Rosenfeld et Cic.	1	— z	
Coopnik Dannenbunn frères.	1	- Z	
Coswig Fabrique de papier.	1	- z	
Berlin, - Uslne à gm.	1	- z	

Belgique

Bruxelles. — L'échirage à la chambre des députés neus a valu le certificat officiel suivant :

CHAMBRE DES REPRÉSENTANTS Bruxelles, lo

OUESTURE

S Bruxelles, ic 19 mars 1883.

the state of the s

. Je soussigné, G. Wather, Membre et Questeur de la Chambre des Repesintants, certife que les orasis de l'élairage étabil dans les sulle des séances de la Chambre des Repetsonants, par les soins du Crédit Général repréciontait en Belgique la Compagnie Continentaire Electrique Elfons de Paris, an moyen de Jampe à Housel, paris de l'appendient paris, au moyen de Jampe à Housel, au l'appendient de rouvelle de vue de la figil de la lumière et du pou de dévelerement de la challeur.

Ces essuis ont eu lieu du 23 janvier au 9 mars 1883. »

Signé : G. Washen.

Bruxelles. — Le théâtre du Pare vient de cléturer. Notre éclairage a fenctionné jusqu'à la flu de la suison et à la grande autification du public augsi bien que da directour et les artifates. Une partie de matriel aert en comment pour l'échirape du trédit de la comment de la comment

Bruxullea. — Nosa aviena demandé ji v quelque tempe un cellega musiloque de cete villa Protection d'a veste un as station externée avec ment en la contraction d'a veste un as station externée de 2000 humps qui ne fut pas ucceside parce que les autotites torvaviente que expérience se les essais faits es Bojeque n'étainet par encors suffixamment concluents. Or, que la fraissie et la grand assocé do noter concluents. Or, que la fraissie et la grand assocé do noter concluents. Or que la fraissie et la grand assocé do noter partier et sous especies ne revoir ciu fast tes pos de temps a prafer et sous especies ne revoir ciu fast tes pos de temps a present contractio de dix millo lampse qui descrivament de la considera de la consid

Hande.

Notro penciani bulletin domen a non becture des souvelles sur l'insuguiron de instation centri de l'autorima, qui aux sine vezs in în de co mois. La station centrale d'Ametriana suiva a mois prochair; les travures cat digitries vanocis. Parmi les instaliations tooles, nous nous bornonne de citre pela simportantes, non arivarnos, du real, qu'à réplése escore uno bis tout le béan que nous avons dit de mos actere instaliations. Depais notre permète installation de mos actere instaliations. Depais not promise invesse ou jamin amo dictardompi jusqu'à co jour, non àvons ou jamin ainstaliation de principal de la consenie de signification de la consenie de la consenie de la consenie de jamin ainstaliation de la consenie de capital de la central similation de la consenie de la consenie de depais de duce central similation de la consenie de la consenie de depais de duce central similation de la consenie de la consenie de depais de la central similation de la consenie de la consenie de depais de la central de la consenie de la consenie de la consenie de depais de la central de la central de la consenie de la consenie de la consenie de la consenie de la central de la consenie de la consenie de la consenie de la central de la consenie de la consenie de la consenie de la consenie de la central de la consenie de l Voici la liste des installations les plus importantes de la Hellande :

Amsterdom. - Sucrerie dite de Wester-Sulkerruffnudery (environ 500 lampes).

- Ruffinorio Spokler et Tutterode.

d". — Brasserie Peters-Kroy et Cie.

Rotterdom. — Imprimorie du Journal « Nieuwe Rotterdann seite Courant, »

Groningen : Tissage Schosuebaum,
Amsterdam : Minoterie « de Welchsel ».

Notre Société Hollandaiso prépare des installations pour : Amsterdam : Le Journal « Handelsblad ».

d Le cercle « Leesmuseum ». et pour plusieurs théutres et industriels.

Antelche-Hongele.

Vienne (Autrioho). — Nous sommes occupés en es ment à préparer le matériol pour l'Exposition Internationale d'Électricité, qui s'ouvrira à Vienne au mois d'août. Notre exposition se composera de 1 dyname K, 1 dyname L et de l'upane L et d'upane L et

Triente. — Lo gouvernement autrichien va faire des essais avec notre systèmeà bord d'un vaissenu de guerre. Nous contruisons un dynemo spéciul du type L. qui sera actionné par un moteur Brothorhood. L'éclairace commendra 1501annes A.

Prague. — Le grand théâtre national actuellement or construction à Prague, capitale de la Bohème, sera celairie entiérement par nos lampes. On y installera 7 dynamos K et i dynamo Z qui actionneront prés le 2000 lampes. Nous

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reviendrens sur cettu installation importante après l'inaugurution de l'éclairage.

Parmi les installations commandées, mais qui ne sout pas cucero teut à fait meutées, neus mentionneus celles de Vtenne. — Tagoblatt (journal le plus répandu de l'Au-

Rohntetz. — Lu graude Suererie de M. Auspitzer. Kremster. — Hunna Malz Fabrik (fabrique do Multe),

friche)

.....

Moscou. — Notre système a contribué largement û la réussité des fôtes données à l'occasion du couronnement du Txar à Moscou. Le Kremlin était illumini par 3,500 de nos lampes et l'effet que produisait cet éclairage a enthousissmé tout le monde. Le l'étrault de Saint-Pétersburg (Saint-Pétersburg Heroids), publie le rapport suivant:

a. L'Illustiantion qui avvil les le jour de comensement sutinité dans les rous totes le population de Mossone de surécut dans la proximité des Kremiiu. Tont te monde voulité voir l'Illustianties dest on exalt tent les tents parti pendant des semines et qui devait surpasser tout partie pendant des semines et qui devait surpasser tout en qu'on marit un juneit pen junei et de cet écle écloi liber mitation dérait un spect grandisse et incomparable. Les mitation dérait un spect grandisse et incomparable. Les réceptus, l'infracté de la lamiera, l'acte partie par les parties qu'en par peut jamais obtenir avoc un unitre mode d'échierge, etc contribusit à mos filer peuser sux palsa des fies deat nous gardens un vugue souvenir de notre mânes.

Lo journal Nowe Wreme dit:

« Iwan le Grand tont illuminé par les lampes électriques Edison présentait un aspect vraiment magique, »

Hall

Milan. - La station centrale sera prôte à fonctionner avant lu fin du mois de juin. La Seciétà italienno Edison a neheté le theatre Santa-Radegonda et y a installé l'usine contrale, L'installation comprendra 12 dynames C peuvant nctionner 12,000 lampes A. On commencera par 4 dynamos (4,800 lampes A) notionnés par 2 moteurs Armington et 2 moteurs Porter-Allen qui sont installés dans le seus sel pour dviter les secousses. En lace de ces quatre dynames se trouvent 4.200 lampes A qui servent peur les essais des machines. Tout autour sont places les conducteurs, reliant les dynames nux càbles extiriours d'une longueur totale de 4,000 mètres environ. Ce travail a été exécuté par M. Patterson, ingénieur do New-York et les essais ont été des plus sutisfaisants. Le montage des dynamos a été exécuté par M. Hennis, La dir-retion de la station centrale pour tout ce qui regarde le matériel électrique est coufiée à M. Lieb. An rez-de-chaussie sont placées deux batteries de chaudières représentant une force de 750 chevaux-vaneur environ, feurnies par la maison Babcock et Wilcox do New-York ot Glasgow . Les chaudières sont desservies par uno chominée en maconnerie de 52 mètres de hauteur. Au premier étage onfin se trouvent installés le chambro des expériences et le magasin du matériel.

Tour in chaldinements principanx du centre de la ville de Milan sexuel desirber par exte station. Nous cliene neitre autres to bildiro Manzani qui sens insugurès precinionnel avez le nouverse pième d'échairpe. Le presse at l'utilité par paid que demandre. Le presse de l'utilité par le proposition de la compartie de la commandation de

Aux installations isolées, mentionnées dans le dernier bulletin, nous pouvons ajouter les suivantes déjà en fonctionne-

Sampierdarenn. - Scerno Gismondi et Cie, Huilerio, 15 lampes A

Pordenone. - A. Ammau et Wepfer, filnture de coten, 60 lampes A. Gênes. — Voilà une lettro adressée au Comité italien,

par MM. Cassanello Fili fu Pietro :

Géner, le 30 novembre 1882.

- « Il y a presque deux mois que nous nons servons de la « lumièro Edison dans notre moulin de Pegli et neus nous empressons de vous déclarer que nous en sommes très satis-
- « faits. La lumière est fixe, intense et limpide. La force
- « nécessaire pour la machine est très petite et même infé-« ricure à celle que vous nous aviez indiquée. Enfin nous
- « croyons que la lumière Edison est supérioure à tous les

- « autres systèmes d'éclairage que nous connaissons et neas « n'aurons nueune difficulté, à le faire constater par tous « ceux qui voudront bien visiter notre établissement.
 - « Signé : Fratelli Cassanello fu Pietro, »

Puis nous sommes en traîn de monter en ee moment les installations suivantes:

Livourne. - Auguste Traxler, Villa, 45 lamnes A. Gênes. - Sirio, steamer de la Société Reggio et C. 150 lampes A.

Vaprio. — Benigno Crespi, filature de coton, 150 lampes A. M. Crespi a déjà dans son établissement une installation de 60 lampes A, fonctionnant dopuis un an. Les résultats obtenus l'ayant parfaitement convainen des nombreux avantages de notre système d'éclairage, il nous a commandé une nouvello installation de 150 lampes,

Pise. — M. Giacomo Nissim, nprés avoir essayé pendant huit mois notro système avec une installation de 60 lampes. vient de nous en commander une do 250. Nous communiquons à nos lecteurs le certificat suivant de cette maison :

Pier, le 28 octobre 1882.

« Je, soussigné, déclare que depuis plusieurs semaines « fonctionnent dans mon établissement pour la production « mécanique de tissus à couleur, une machine dyname-élec-

« trique et 60 lampes à incandescence, qui m'ont ôté four-« nies par le Comité ponr les applications de l'Etectricité. « système Edison, en Italie, et j'en suis pleinement satisfait

" sous tous les rapports. « Signé : pp. Glacomo Nissim.

« ALEXANDRE NISSIM. » Denx nutres installations de 15 lampes A seront montées prochainement.

Tenzanico (Lecco). - La filature de soie do M. Monti.

Teducolo (Naples). — Le monlin à vapeur de MM. Wegnan, Bodmer et Cr. S. Giovanni.

Nous avons enfin des pourparlers très avancés avec de très nombreux établissements industriels parmi lesquels nous pouvons eiter:

Venise. — Le nouveau Cotonificio Veneziano (300) lampes A).

Castelnuovo. — Le nouvel établissement do MM. Crespi et C^* (60 lampes A).

Assa-Como. — La filature mécanique do M. Antonio Oltolino, etc.

Nous mentionanes encore que 400 lampes Edition containtalleca au beat du cuiransă Dinado, de la marin compulitationes of que la durée moyenne de cue 400 lampes est tatellement é ol 1778 boures. Co résultat a ament une décision du Comitô des constructions navales en Italia, qui, particular de la construction de la contrata de la construction de moyen de la construction de most de la construction de la

OLS PARTS - IMPRIMENTS CHARGES BOOT, MIN MARIS.

Societe Electrique Edison

This folder contains printed material issued by the Societe Electrique Edison, Organized in Paris on February 17, 1882, this company marketed isolated lighting plants in Austria, Belgium, Denmark, France, Germany, Hungary, Italy, Russia, and Spain under license from the Compagnie Continentale Edison.

The following Items have been filmed:

- "La Lumiere Edison" (1884)
 "Liste des Etablissements Eclaires par les Lampes Edison" (1885)

LA

LUMIÈRE EDISON

SYSTÈME D'ÉCLAIRAGE ÉLECTRIQUE

TRANSMISSION

DE LA FORCE MOTRICE A DOMICILE

DIXIÈNE ÉDITION

PARIS
LIBRAIRIE CENTRALES DES CHEMINS DE FEI
IMPRIMERIE CHAIX

rue Bergère, 20

LA LUMIÈRE EDISON

CHAPITRE PREMIER

LE SYSTÈME EDISON

But d'Edison. — Divisibilité de la lumière. — Foyers de 1, 2 et 4 carcols. — Production en grand de l'édecricité dans des seations centrales. — Usine de New-York. — Distribution de l'édecricités. — Supériorité de la lumière Edison sur l'édesinge au gaz. — Elle ent destinée à le remplacer, .— Applications spéciales à la lumière décrique. — Transport de la force motrice à domicille.

En commençant ses recherches sur la lumière électrique, Edison s'est immédiatement posé le problème suivant :

Gréer un système complet d'éclairage par l'électrieité, qui puisse se substituer purement et simplement au système actuellement en usage de l'éclairage par le gaz. Réunir, par conséquent, tous les avantages que présente le gaz à ceux que peut procurer l'emploi de l'électricité.

L'Exposition de 1881 a montré, au monde étonné des savants et des industriels, qu'il avait suffi de deux années à Edison pour remplir entièrement son gigantesque programme, et pour vaincre une à une les innombrables difficultés gul avaient surgi sur son chemin.

Nous avons dit que dans la pensée d'Edison la lumière électrique qu'il cherchait à réaliser était destinée à remplacer le gaz en toutes circonstances.

Voyons quelles conditions elle allait avoir à remplir.

La première question qui se présentait, celle que beaucoup de personnes, et des plus compétentes, avaient a priori déclarée irréalisable, était de produire des fovers suffisamment faibles pour ne pas blesser la vue.

Les lampes électriques les plus modérées que l'on eut obtenues jusqu'alors, possedaient encore un éclat insoutenable qui en limitait l'usage à quelques applications en nombre très restreint. On ne pouvait guère éclairer que des chantiers, des places publiques, ou des espaces fermes d'une grandeur exceptionnelle, tels que cirques, hippodromes, salles d'exposition.

Encore ne parvenait-on à ce résultat qu'à grand

LA LUMIÈRE EDISON renfort de globes dépolis qui, en absorbant des quantités considérables de lumière, augmentaient notablement le prix de revlent.

Quant à l'éclairage domestique il n'y fallait pas songer. La plus forte intensité que l'œil puisse supporter sans fatigue est évaluée à 16 bougies anglaises (1.72 carcels), et la lumière voltaïque tamisée par le verre dépoli ne descendalt pas au-dessous de 25 à 30 carcels.

Edison prit comme base de ses recherches cette intensité de 16 bougies, qui est aussi celle des forts becs de gaz, et il ne se tint pour satisfait qu'après avoir obtenu une lampe électrique donnant précisément cette quantité de lumière. Elle est connue sous le nom de lampe A.

C'était déjà un immense progrès. Mais une lumière qui avait la prétention de se substituer au gaz en tout et pour tout, ne devait pas se borner à remplacer les gros becs. Il fallait une lampe plus faible de moitié, qui pût jouer le rôle des petits bees d'appartements. Aussi Edison créa-t-il le type de 8 bougies, ou lampe B (0,75 à 1 carcel).

Alors se passa un phénomène curieux. Les mêmes personnes qui avaient dénigré le plus chalcureusement les arcs voltalques parce que ceux-ci produisaient trop de lumlère, se mirent à combattre avec non moins de conviction les lampes à incandescence, parce qu'elles n'en donnaient pas assez!

Elles oubliaient que les lampes à incandescence sont destinées à remplacer, non pas les arcs volatiques, pour l'échirge des grands espaces, mais bien, nous le répétons, les becs de gaz, les lampes domestiques, voire même les bougies pour l'échirge des appartements, de bureux, des théâtres et d'une manière générale, des salles de dilmessions conrantes

Du reste le reproche d'être trop faibles, que quelques personnes ont parfois adresséaux foyers incandescents, est parmi les moins heureux qu'elles aient pu imaginer, attendu qu'on est maître de leur donner telle intensité que l'on voudra. Nous verrons dans le chapitre suivant les types auxquels on s'est arrêté.

De ce qui précède, il reste acquis qu'Edison a réalisé des foyers électriques équivalents en intensité à ceux obtenus par le gaz.

Pour les faire fonctionner il faut une machine électrique qui produise le courant voulu, et un moteur qui actionne la machine électrique. S'il fallat avoir un moteur dans chaque immeuble à éclairer, la question ne serait pas plus avancée que ne le serait celle du gas, s'il ravit fallu une petite usine dans chaque maison. Auxi Editon aborda-ril 1 tout de suite le problème suivant: produire. Pélectricisé dans deu usivant centrales, et la transporter au lieu de consommation au moyen d'une canalisation souterraine comme celle du gas.

Supposons que nous voullons éclairer toute une ville au moyen de l'électricité. Nous la diviseronse nu certain nombre d'arrondissements, dont l'étendue sera fixée d'après la consommation probable, et dans chaeun desquels nous établirons une unine centrale.

Penons comme exemple d'usinc celle qui fonctionne depuis le mois de septembre 1883 infonctionne depuis le mois de septembre 1883 dans Pearl resultat de la celle de la celle per Edition pour l'échierque du que de la celle per Edition pour l'échierque du que de la celle d

nécessaire pour faire marcher 12 machines électriques du type de 1,200 lampes. Cela représente une force d'environ 1,500 chevaux allmentant 14.400 lampes A, ou 28,800 lampes B.

. De l'usine centrale rayonnent en tous sens de gros conducteurs en cuivre appelés conducteurs principaux, qui se bifurquent à droite et à gauche comme des conduites d'eau et de gaz, pour longer toutes les rues. On peut les poser avantageusement dans les égouts. La maison de chaque abonné est reliée aux conducteurs principaux par une conduite dite conduite d'immeuble, dont la grosseur est proportionnée aux besoins de la maison.

Cette conduite aboutit à un compteur, que l'on place par exemple dans le sous-sol comme un compteur à gaz. Il mesure la quantité exacte d'électricité consommée pendant le mois ou le trimestre écoulé

Du compteur partent des fils qui sillonnent la maison en tous sens. Ce sont de simples fils semblables à ceux des sonnettes électriques d'appartement. Il est aisé de les dissimuler et la pose s'en fait avec la plus grande facilité, sans endommager les murs ni les tentures,

. La lumière électrique présente sur le gaz des

avantages très sérieux, tant au point de vue de la santé que du bien-être.

Un bec de gaz, on le sait, absorbe autant d'oxygène que deux personnes, puis, outre les flots d'acide carbonique et d'oxyde de carbone, ce poison violent qu'il déverse dans l'atmosphère. il apporte tous les gaz délétères qui proviennent des impuretés de la houille; il répand ainsi des quantités considérables d'acide sulfureux, un gaz qui salit les murs, noircit les peintures, et auquel quelques années ont suffi pour faire disparaître les superbes plafonds et panneaux de Baudry, au fover de l'Onéra.

Un autre inconvénient du gaz dont nous souffrons cruellement, surtout en été, c'est l'énorme quantité de chaleur qu'il dégage. Or, c'est principalement dans les locaux tels que les salles de bals, de spectacles, de conférences, où se trouvent réunies un grand nombre de personnes, et dont la ventilation est par sulte plus difficile, que l'on accumule les foyers lumineux. Ceux-ci accélèrent d'une manière effrayante la décomposition de l'air et produisent une chaleur souvent intolérable.

Avec la lampe Edison tous ces inconvénients disparaissent. Elle n'emprunte rien à l'atmosphère et ne lul cède rien. Elle dégage douze fois moins de chaleur, que le gas, n'influe pas sensiblement sur la température, et oute n'éontent une lumière douce, finc et l'implée comme celle 'du collet, elle content à l'est est est l'indiversallement coute as fricheur. Aussi est-il universallement coute as fricheur. Aussi est-il universallement le coute as fricheur. Aussi est-il universallement le coute au content de douce qu'elle est-il endre des deux des douce qu'elle est-public à le voir de l'est de content de la coute qu'elle est public de troitent pas de la coute qu'elle qu'elle projet de troitent pas en pas par de la comme de la propie de la comme de la comme de la propie de la comme de la co

A ce sujet l'épreuve en grand tentée à New-York est des plus intéressantes, des plus instructives, et des plus concluantes, car on a créé depuis de nouvelles stations centrales dans différențes villes des États-Unis,

L'exemple aussi ne pouvait manquer d'être sui vi en Europe et nous avons vu s'établir à Milan, d'abord, une station centrale de 4,000 foyers qui éclairent un grand nombre de particuliers et plusieurs théâtres, entre autres celui de la Scala.

Puis d'autres stations se sont élevées à Amsterdam, Rotterdam et Bruxelles.

Nous avons vu que la lumière Edison pouvait se substituer avantageusement à l'éclairage par le gaz, partout ou celui-ci est en usage; mais il est des applications fort intéressantes qui sont spéciales à la lumière électrique; telles que les mines, les tissages et les bateaux à vapeur.

On seit que le gaz ne peut gutre être employé de les tissages à cuuse des dangers d'încendie qu'il présente, et surtout parce qu'il change les couleurs. Ces deux inconvénients mojeurs sont absolument écartés par la lempe Édison; aussi en e-t-on fait usage avec le plus grand succès dans d'împortants tissages à Lille, Roubaix, Tourcoing, etc.

touchous, etc., Edition est appelée à rendre les paginales revires à la mairie. Ellis fonctionne productionners sur un grand nombre de vapeurs. On apprécie boancoup à bord cette lumière fine et douce, qui n'a put beard n'être allumée, monachée, surreillée constamment, comme les quinquets employé jusqu'alors; cette lumière qu'uncur veur rééctint, qui n'eviée pas l'air des érroites cabines du vaisseus, et qui brâle même sous l'estat de dermière qualité a permis de l'employer pour visiter l'hélice, le gouvernail et la coque du navive.

CHAPITRE II

La lampe. — Les doullies. — Les commutateurs. — Lustres et appliques. — Lampes portatives. — Lampes à genouillère.

La lampe Edison (fig. 2) se compose d'un filament de bambou carbonisé porté à l'incandescence par le passage d'un courant électrique. Il est placé à l'intérieur d'un globe de verre ayant la forme et la grosseur d'une poire ordinaire, et dans lequel on a fait le vide. Le petit appendice qui surmonte le globe est la fermeure de l'orifice par lequel on a effectue le vide.

Le col de la lampe est hermétiquement fermé au moyen d'une sorte de bouchon en verre soudé avec lui, qui fait saillie à l'intérieur de la lampe.



Fig. 2. - La lampe.

circulaire de la lampe. Le bout fermé du bouchon est traversé par deux fils de platine isolés . Pun de l'autre et emprisonnés dans la masse du verre au moment de la fermeture du tube. La traversée du verre est un des points délicats de la lampe. Les changements de température tendent à faire jouer les fils et à pratiquer des passages à l'air. C'est pourquoi on emploie des filsde platine dont le coefficient de dilutation se rapproche très sensiblement de celui du verre.

Le filament de charbon est fixé aux fils de platine au moyen d'un dépôt galvanique de cuivre. Pour éviter que la température ne s'élève trop à l'endroit des soudures, ce qui pourrait amener la fusion du cuivre, le charbon présente à ass extrémités un élargissement, dont le but est de diminuer en ces points la résistance au courant.

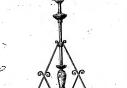
Les fils de platine sont reliés par leurs bouts libres à deux armatures en cuivre isolées l'une de l'autre, et scellées dans un tampon en platre qui forme le socie de la lampe.

Le vide dans le globe sert à assurer le durée du filament de charbon, qui, s'il 3'échauffait à l'air, brûlerait en quelques instants. Le lampe serait immédiatement hors d'usage, tundis que l'Uncandescence dans le vide, en mépéhant la combustion du charbon, assure aux lampes Edison une durée de sept à l'auit mois, 'quivalente à une durée mogenne de 80e heures' d'éclairage.

En même temps elle donne à la lumière cette couleur dorée agréable aux yeux, si différente de la lumière blanche de l'arc voltaïque ou des lumpes à incandescence à l'air libre. Quand une lampe est hors de service, il suffit de la dévisser et d'en replacer une neuve dans la douille. Cecl s'effectue avec la plus grande facilité : un enfant même peut s'en charger.



La simplicité d'attache des lampes permet de les employer sous toutes les formes en usage pour le gaz (fig. 3, 4, 5). On peut donc les disposer sur des appliques des lustres, et même sur des chandeliers portatifs. En outre les lampes à incandescence se prêtent beaucoup mieux à l'ornementation que le gaz ou les bougies, car elles brûlent dans



LA LUMIÈRE EDISON

tous les sens. La lumière y est aussi utilisée d'une façon plus avantageuse puisqu'on peut la



Fig. 5. - Lampe portotive. diriger au moyen de réflecteurs sur tels points que l'on voudra. C'est une qualité précieuse pour

LA LUMIÈRE EDISON éclairer le travail des ouvriers. Dans les lustres on pourra mettre la lampe la tête en bas, toute la lumière sera réfléchie vers le sol sans projeter aucune ombre.

Les lustres sont munis d'un commutateur général jouant le rôle des robinets à gaz à grande section et permettant d'allumer ou d'éteindre toutes les lampes à la fois; ce qui n'empêche pas chaque bec d'être pourvu de son petit commutateur particulier.

Pour satisfaire à certaines exigences spéciales, comme celles des théâtres par exemple, où il est nécessaire de pouvoir affaiblir ou augmenter à volonté l'intensité d'un groupe de becs, on emploie un rhéostat analogue au régulateur de la macbine dont nous donnons la description plus loin. Les jeux de lumière sont ainsi obtenus avec la même facilité qu'au moyen du gaz.

CHAPITRE 111

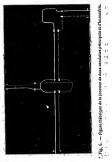
LA CANALISATION

Conducteurs. - Boltes de jonction. - Coupe-circuits

Le transport de l'électricité scrvant à la production de la lumière s'effectue au moyen de conducteurs en cuivre.

conducteurs en cuivre.

Pour de fisibles quantités, de simples fils sufficent; mais, au cau qui nous occups de l'étainge de tout uni quarder, Il faut de vérticables chies pour donner passage aux quantités finemes de le comme de la meditine de sutions certaines deverage de meditaire des sutions certaines deverage de me de l'étaire de la comme del la comme de la comme del comme de la comme de la comme de la comme del comme de la comme d



Les deux conducteurs sont empâtés dans une substance Isolante contenue dans des tubes en fer. Ces tubes sont soudés à recouvrement et revêtus d'un ruban goudronné destiné à les préserver de l'oxydation.

On en fait de dix dimensions différentes.

On en fait de dix dimensions auscreitles.

Le plus gros a un diamètre extérieur de 8 centimètres. Nous sommes bien loin de ces énormes
tuyaux de gaz de plus d'un mètre de diamètre
pour lesquels il faut creuser de vastes tranchées
et dont la pose est si coûteuse et incommode.

Quand on veut réunir deux tronçous de conduites principales, on so sert d'une, paire d'arcades on cuttre dont les deux extrémités portent des ouvertures syant la forme demit-cylindrique des conducteurs. On introduit les deux extrémités du fil d'aller dans les ouvertures d'une des arcades et on les serre au moyen d'une vis de pression. On joint de même le extrémités du fil de retour. La comfauité du circuit se trouve

alors établie.
L'embranchement d'une conduite d'immeuble sur la conduite principale est représentée fig. 6.
Elle s'effectue à l'aide d'une botte de jonction en fonte (fig. 7), placée en face de la maison à éclairer et sur le chemin même de la conduite principale.



A Pinnérieur, les conducteurs sont mis à nu et rénant deux à deux au moyen d'arcades comme colles que nous venons de décrire, mais nunies en outre d'éperons auxqueit vienners actuacher les deux conducteurs de la sendidant d'immenble, pour graffer les conduites des différents spunchents sur la conduite générale d'Ammenble, on emplois des bottes en fonse autre d'Ammenble, on complois des bottes en fonse autre d'Ammenble, on complois des bottes en fonse autre d'Ammenble, on centre de la conduite générale de la contrain de la con

reconvertes d'un enduit isoreun.
Elles sont en outre munles d'un coupe-circuit et Le coupe-circuit est un petit, fil en plomb de grosseur convenable, dont le but est de rendre impossible toute cause d'incendie et de sauve-garder les lampes des accidents que pourrait occasionner un outraint trop-intense.

occasionare un comunit usy mariano cus pour une Supponora que pour une raison cus pour une suive il rienne à se produire un centre direct entre les fits d'utile et de reburx. La plus grande purite du courant passers par la et les lampes réciendorat, miss, de plus, la reistance opposée au courant-ésant bien plus faible qu'elle ne l'failt quand il passe instérmente par les lampes, son innensité deviendre beausoup plus forte et les conducteurs s'échantièrent. Il y a un coupe-circuit, nous l'avons dit, dans chaque boite de jonction d'appartement, mais ilt, y en a aussi à chaque ramification du course, et pour chaque groupe de lampes. On voit quelles précautions méticuleuse Edison a prises pour écarter jusqu'à la possibilité la plus improbable de danger.

Quand un cospecieruit a joué, un employé de la compagnie visite l'embranchement qui se trouve par là melme isodé, répare le défaut de circuit et remet un fil en plomb. Ce fil se trouve disposé dans une sorte de bouchon en bols ou en plâtre muni d'un pas de vis. On le vises à la main dans une pette douille placé à l'endroit où a été ménagé le coupe-circuit. Le remplacement s'effectue donc de la manière la plus simple.

CHAPITRE IV

LA MACHINE

Principe de la machine. — Son rendement Différentes espèces de machines.

. 14

On appelle champ magnétique tout espace dans lequel agissent des forces magnétiques; ainsi l'espace qui entoure un aimant est évidemment un champ magnétique.

Tout le monde sait que si dans le champ d'un aimant on introduit des objets en fer, lis secont attirés plus ou moins vivemen selon que l'intensité du champ sera plus ou moins forte, o ou, en d'autres termes, suivant que l'aimant sera plus ou moins puissent. Mais un clamp maggédique donne encore lieu: h'd'autres phénomènes. Si on y promène tout ou partie d'un circuit conducteur, les différentes portions du circuit conducteur, les différentes portions du circuit

ainsi mises en mouvement dans le champ tendront à faire naître dans le circuit tout entier des courants électriques qui seront d'autant plus intenses que la vitesse imprimée à la partie mobile du circuit sera plus grande et que l'intensité du champ sera plus forte.

Dans une machine électrique Edison, le champ est produit par un électro-aimant double (1). Le circuit est formé de deux parties :

L'une, l'armature, mobile dans le champ, magnétique, engendre le courant ; l'autre, fixe, est constituée par les lampes et les conducteurs. Une dérivation du circuit fixe passe dans les électro-aimants et en produit l'aimantation.

La partie mobile du circuit, qui est la bobine ou l'armature de la machine, se compose d'un fil de cuivre enroulé longitudinalement sur un cylindre de manière à le recouvrir sur toute sa surface. Les deux bouts libres du fil sont soudés ensemble, de telle sorte que toute la bobine forme un seul circuit fermé. Dans certaines machines Edison ce ne sont pas, à proprement

courage à travers ce fil, le cylindre en fer s'e

parler, des fils qui forment les génératrices du cylindre, mais des barres de cuivre isolées les unes des autres. Elles sont reliées entre elles par leurs extrémités au moyen de disques en cuivre de même diamètre que le cylindre et perpendiculaires à son axe. Les disques sont isolés s uns des autres. Chacun d'eux réunit les extrémités de deux génératrices, et les jonctions sont combinées de manière à ce que le tout constitue encore un circuit fermé.

On fait tourner l'armature autour de son axe entre les pôles de l'électro-aimant, parce que l'intensité du champ est la plus forte en cet endroit. Si toutefois la bobine se réduisait à ce que nous venons de dire il n'y aurait aucun courant. Cela tient au mode d'enroulement du fil. Il est tel que les courants élémentaires qui tendent à prendre naissance dans chacune des génératrices de l'armature sont deux à deux égaux et de sens opposé. Toutes les génératrices donnant lieu à des courants qui parcourent le circuit de l'armature dans un même sens se trouvent dans une même moitié de ce circuit. Il s'ensuit que la bobine se compose de deux moitiés tendant à être parcourues par deux courants égaux et de sens contraire. Il faut une disposition qui per31

mette à ces deux courants de se produire en les dirigeant dans le circuit extérieur.

A cet effet l'armature est munie d'un commulateur. Il se compose d'un cylindre beucoup plus peit que le précédent, placé sur le même axe et dans son prolongement. On le vois (fig. 8) à Petrtémité opposée on se trovave la poulle. Les génératrices sont formées de, barres de cuivre tout à fait isolées les unes des autres, mais reliées chacune à l'un de, disques en cuivre de la bobline.

la booine.

On place deux balats formant ¡les extrémites du circuit extérieur, sur deux, génératrices opposées du communateur, alors les, deux courants de la bobine qui étaient opposés l'un à l'autre s'élancent ensemble par le débouché commun. dans conducteurs en s'ajoutant, au lieu de se paralyser mutuellement.

Ce qui se passe ici est analogue à ce qui aurait lieu dans deux piles réunies par leurs pôtes de même nom; aucun courant ne se produirait; mais qu'on vienne à relier par un fil de culvre le fil qui joint les deux pôtes positifs à cetui qui joint les pôtes negatifs, aussitét le courant prendur anaissance.



Fig. 8. - Dynamo de 120 lampes.

TYPES DES MACHINES EDISON NOMBRA FORCE FORCE INTENSITÉ de lamps A en éléculementifice de PRIN Le ren disparer courses en vivie ampères

de lampes A s'elle peut slimenter	CHENTX	CE VOLIS	rechier	PALS.
25	3+	110	, 18	1,500
50	6 ‡	110	38	2,800
100	121	110	75	3,500
200	25	110	150	5,000
300	37 +	110 -	225	7,000
- 500	62 ±	110	385	10,000
1,000	125		750	15,000
On peut tou	jours	remplacer	une lan	pe A pa

deux lampes B.

Il existe aussi un petit modèle pouvant ali-

Il existe aussi un petit modèle pouvant alimenter 20 lampes de 6 bougles avec un cheval de force. Cerdynamo copvient pour de petites installations privées. Son prix est de 400 francs.

TYPES DES LAMPES EDISON

DÉSIGN	ATION	POU!	VOIR	OMBRE-	ENSITE	ISTANCE US IN CAME	OMBRE LANPER	PRIX .
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ž,		. 6	0.86 0.615 0.43	#12	0.75 1. 3 1.4	:	16 16 35	44.

REGULATEUR

Le régulateur se compose d'une boîte carrée (fig. 9) surmontée d'un manipulateur tout semblable à celui du télégraphe à cadran de Bréguet et munie de deux bornes.

L'une d'elles est reliée à l'axe de la manette, l'autre à l'extrémité d'un fil en maillechort placé à l'intérieur de la boîte et enroulé sur une carcasse en bois, de manière que les différentes spires soient isolées les unes des autres.

Des secteurs isolés du cadran partent des fils de cuivre allant se rattacher successivement au fil de maillechort en des points de plus en plus éloignés de son extrémité.

éloignes de son extremite. Le courant arrivant par l'une des bornes à las manette, passe dans le fil en maillechort à travers le secteur qui est en contact avec elle et ressort par l'autre borne.

En déplaçant la manette on augmente ou ondiminue à volonté la quantité de fil interposée et on modifie par suite la résistance du cirçuit; orr peut ainsi faire passer les lampes par toutes les intensités, depuis le rouge le plus sombre jusqu'au blanc éclatant.

LA LUMIÈRE EDISON

DYNAMO DE 25 LAMPES A

13 LAMPES A ET 24 LAMPES B OU 50 LAMPES B

Prix : 4,500 ferres.

Dimensions de la base : 0",714 × 0",516. — Hauseur : 0",780. — Polis : 350 kit.

Mad	PRIX MOY	er, Commutes		LECTRIQUE v, Lenju, Fr	
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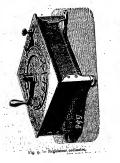
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Fore effortie obsolie i 6 1/2 christwootes.

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Dissensions de la basero ",5100,00",520,... Hauteur co "880,... Poids : 48; hii. Poulle : dismère, 2101 largeur 110,.... Nombre de 1000 1 1 100

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	4.130 fr.	4.370 fr.	4.600 fr.	4.815 fr.	5.115 fr.	5-415 fr.



LA LUMIÈRE EDISON

DYNAMO DE 100 LAMPES A

50 LAMPES A RT 100 LAMPES B OU 200 LAMPES B

Fora effective obserbie 1 to 1/2 chromo-repear. Prix 1 3,500 feates.

rra 1 0,000 ment. nices de la base 04,90×04,90.—Hencers 6495, .—Polda : 550 kH. Poulle : diamère, 300; largeur, 200.—Nombre de 10011 1 ,200. PRIX NOYEN DU MATÉRIEL ÉLECTRIQUE Machine, Rigulatore, Communitores, Donilles, Lampes, File, etc. INSTALLATION

PARTICULIÈRE 100 A 50 A 100 B 100 A | 50 A | ct 100 B 1.950 fr. 6.450 fr. 6.950 fr. 6.550 fr. 7.150 fr. 7.750 fr

DÝNAMO DE 200 LAMPES A 100 LAMPES A ET 200 LAMPES B OU 400 LAMPES B

Four effective stands is 31 shoeses-refere.
Frix ; 5,000 fraces.
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250 LAMPES A ET 500 LAMPES B OU 1,000 LAMPES B Fere efective absolie : \$2 1/2 che.eve-report,

Fore officine abovie : 6a : 1/2 chemo-oper,
Pris : 10,000 france.
ulous de la base: ==4,190,000,france.
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lessant febres	De de Piere	Fab. de chapeaux	So .
1		an conjectur	17

CHADALACCINE SHE

NOMS	VILLES	NATURE bes todays	TYPE of system	NOMBRE SELLERPES		NONS	VILLES	NATURE DES LOCAUE
Diedericha	Bearrein		\Box		1	Destant file	Orlina	Vinsiget
sition	Cocu	Tissage de sole	II	120	1	Salupole feères	Uncons	Genfaerle
Ch. Celliard	Czen	Galeries		#10		M- Venve Held et fib	Po.	Const. de machin
Ci. Cillus	Catego	Tiss. de labres	J I	150		MM. Agethe file	Pierechies	
ound	Cogene	Vins et alcools	1: 1	77		J. Bardon et fils		Timege
Bain,	Condi s-Note		, ,	73		Femil feères	Pespigsan	Papier & eigarette
		Papeterle	1 1	120	1	Penal fetres	Perorne	Falencerie
ns	Dijon	Confectio	1 1	17		Élemet Lefebere	Pont-Anthou	Fliatore
	Erza-Bonnes	Casino et lardio .		34		Authori Hoebs et Ci	Remirement	-
Darbley et Béraoger.	Essence	Pareterie	l f	160		Manchet et Klêber	Rives	Papeterie
in	Gorman	Sclerie		17		Morte et Mellassous	Roubaig	Teintererie
ine	Ivry-sur-Scho	Forges	1	77	1	Look Lefebree,	-	Pilature
Industricife et con-				.,,	1 4	Auguste Lepoutre	l -	Fillature et tisser
relaie Ečison	l _	Atellers		١١	1 1	Torsysck fetres	1 -	- "
eberel fetres	Jarméell	Filatore		230	1	Diffes felera	-	_
re pire et fils	Lille	1	- 1		1 3	Amélie Progress et Co.,		Peignage et film.
rt-Cailletter	Tidere	1	- 1	140		Mone-Boset 61,		Filarupe de lalos
Cheustland	Linear		- 1	220	1 7	Wibers Florie		-
abatié et C	Manager	Apprèts et moires	f	10	1 1	Fonderle de l'État	Buelle	Ponder, de curos
et Benkonne		Laloes et penax		118	()	MM. Charalre et fils	Scenar	Interinctic
ot C*	7"	Filature de laines	- 1	17	1 .	Compagnic Française da	ocesure	mprinene
Holieter	-	Laines et peaux	- 1	17.3	1.0	Cetholds.	States	Atelien
Acoeter		Apprits d'écoffes	- 1	251	1 1	Pouderie de l'État	State	Pentenie
La Storce	-	Fabrique de deses	- 1	60.	1 1	Societé des tresseset beer.	Saut-Crane	
ame et Cir	Maningarbo	Beasseries	- 1	17	1 3	MM. Th. Niron	St-Chamond	Passementerie
sicker	Mery-rar-Oise	Art. de voyages	- 1	1301	1 1	P. Schmidt file	St-Didler-fa-S	Papeterie
t et C*	Monteus-L-M.	Mines de Blancy,	- 1	17.	1 3	P. Scheeldt als	Saint-Dib .	Filature
rhand	Nathonne	Vint	- 1	17	100	C. Engène	Saint-Maur	Fab. de couvertre
cure Raymand et Ci-	-	Fab, de carrelages	- 1	27		E. Odies	Salet-Quessin	Mirekeste
mier-Laportolle	Nessolife-te-		- 1	~		Trocmé		Tisrus de cocoe
	Chitae	Distillarie	- 1	77		David Troolllier et Adhi-		
tion	Nice	Galeries				. mar	-	-
letter	Notated	Checeleterie .			1 . I	Les fils de Gulllaumet	.Surestes -	Teleturerie
Peters	Nonesy	Filamer	- 1	2	1 1	Zuber, Rioder et Cie	Torpes	Pareterie -
ller freres		Fab. de concers	-	60	1	Sirven et O	Toelcuse	Papeterie
	. Oneus	LEG. OF COLUCIA.	- 1	17				

ноиз	VILLES	NATURE ORI LOCAUX	TYPE M brown	NOMBRE DE LANTE
Pollet-Caulies et fis P. Mérorel et fis Caulifes père et fis et		Peignage Peignage et flature		300 17
Deissene. A. Clerges et Cir Bershelos, Multatot pêre et fils	Vessul VIC (lister)	Pab, de ploes alim, Pab, de ciment		60 60 15
Étierne Seigle	(Rhône) Voiros	Filance de coton Missoerie Papetezio Fabrique de sole		120 240 34
Deweif Callieret et fils Guillernia et Blancy Deneux frères Ballly fils	Dunkerque Salet-Vallier Cagny Reless	Elévateur Filatree de seie Usine		120 17 21 21
Huret et Lagache Evrard et O	Pade-Brieves Rue	Ξ		21 25 25
	GLETE	RRE	·	1
Holbert visiter. Consellered relephene Co Phillips Bros. Robey, et Co.	Londres — Hackney wick Lincoln	Usine centrale Yellephones Fils de cuivre Constructeurs		120
Archibald Costs, esq T. Taylor Smith, esq	Paisley Enfeld	_	J.	10

LA LUMIÈRE EDISON

ноиз	VILLES	NATURE DES LOCAUX	TYPE st sttano	NOMBRE
Weibors reion stramship C* limbed	Nºs-Zelande	,		150
the Tannania steam na- vigation C	Giscow	Administration		100
Co Deliding by William Deany	Greenock	Administration		130
et Bens	Domberton	Administration Values de guerre		360 173
" Malakar "	London	Restaurant		1000
the House of Commons. Trafalgar Coffery.	Westminster	Parlement		150
ranger Canery	Londres	Hosilitee		60
Society of Arts Landon Brighton and South	Londres	Association		50
Coast rallway company.	l	Éclairage de traito		- 1
Colonel Gourand Show Rooms and Officea of the Meschester and dis-	=	erlaen		10
telet Edison electric light			Ė	
C. Brited Ments Hather et Platt,	Manchester	Salons et bursaus		90
Salford iron Works	-	Forges		1000
Messes D. Moseley at Sons.	- 1	- 1	- 1	1000
Mrs Wright Turner et Sons	Salford	-	- 1	900
Mr George Hopwood	Near Bury	- 1	- 1	110
Messes R. R. Jackson et O.	Bleckburn.	-		110
Meure Gonschalk The "Harrison" patent	Marchester	-	_ [100
steen steering C	Selford	-	- 1	70

LA LUMIERE EDISON

NOMS,	VILLES	NATURE DEA LOCAUX	TYPE SERVING	NOMBRE M LANPER
Thilitre royal		Thiltre	·	50 120
ruite-"	l –	Galerie de pelatore		8o
· A	LLEMA	GNE		1
Gazette de Colegne	Cologne	Garre		-31
Roschke er Buschicet	Zhin	Electricient		181
V. Vocel	Musich	Brasserie		17
Gare erannic	Strasbeurg	Ger	11	
Van der Heyde Chantler de la mariet les-	Elberfeld	Parskuller		ian
périale	Dantale	Charnier		120
Geury frères et C	Honbourg M	Filetere		En
S. Linkwer et Co	Cannatade	Feb. de comets		110
Ungerer et Schulre	Strasbourg	Électriciens	- 1	17
Emile Ascherberg	Dresde	Fak, de pianos	- 1	200
G. Schneller	Goppingen	Electritien		17
Gebr, Lorry	Pessau	Magazin		77
Seo. Andres	Creamach	Febrique de cules		17
W. Hepner	Contin	Négodant	- 1	17
abn Pet, Schneider	Meanied	Pflature	- 1	18
Darkopp	Billefeld	Fab, de mathines		
		1 equire		14
akrique de sucre	Rosin	Sucrenic	- 4	150
trasserie Bohtmiense	Berlin	Brasserie	- 1	6
lisher et Selge	Peetneck	Tituge	- 1	138
tesident Theatre	Menich	Thillie		750
chaeffer et Heuschner	Derito	Fab, de luttres	- 1	77
erze et Crotognio	Romeck	Chaptler	- 1	
erghersen et C	Cologna	Société électrique		

LA LUMIÈRE EDISON .

NOMS .	VILLES	NATURE BEI LOCAUX	TYPE or area	NOMBRE
		Affinerie		
Needdentsche Affinerle	Hambourg Colouse	Electricient		17
Spiecker et C*	Berlin	Feb. de Broidure		17
Datusenbaum frères	Wentman	Fab. de aucre		10
	Coculo			1 56
Fahrique de papier	Brille	Papeterie Gus		6
Unine & gaz	Stutteart	Thillne		1000
W. Reisser,	Abrensbeck	Secrete		150
Sucrerle	Abrensbeck Berlin			150
Slechen		Restaurant		
A. Hoffman	Neugersdorf Heldesheim	Fiance Cont.demachine		2
J., M. Wokh	Neustadt	Sucretie		1,00
Sucrerle	Gourne	Sorrene		1150
Sucreele	Berlin	Club		110
Union club	Berlin	Clab		
Ressource		Mines atreccianis	× .	110
Goerne et C*	Ables Crefeld	Teleturrie	ı	60
J. Neehaus Nachforger	Westen	Teleturerie Union		47
Fr. Buch,				17
Mankach et Reinhardt	Cologue	Électriciens	1	31
Aders	Magdebourg	Fah, de enivre	i	60
	AUTRIC	CHE		
Thélire command		Thiliere	1	11000
Société de Fives-Lille,		Unine	1	15
Schoeller et Ch	Carkowitz	Sucretie	Į	17
1. Huckels Seehre	Neutitachein	Urior		1. 80
Sucreriu	Caclectowitz	Secrete	1	110
Moses Lorer Beer	Tring	Fliature de laine	1	110

	Unine
Carkowitz	Sucreri
Neuritschein	Urios
Caclectowitz	Secret
Brine	Fliature de
Vienne	Catt
Britte	Filanare de
Robstets	Sucreri
	Caskowitz Neutitachein Casiochowitz Reine Vienne Beissu

5o			
	LA	LUMIÉRE	EDISON

	ноня	VILLES	NATURE DES LOCAUX	TYPE be breaso	NOMBRE PE LANE	
- 1	Baron Steinbövel. Neues Wisner Tagblan. Thilite cutional. Union Mülle.	Circusal Vienne Prague Budapent	Fab. de liquenes Jeunal Thélètre Moutle à vapour		60 260 1600 250	•
ı	В	ELGIQ	UE .		- 1	
E S R B A B A B A B A B A B A B A B A B A B	istilia centrale, besses et Dianis, - L. Godhe et Es Pera et C- yy siete. Ellard et Bess Bess et C- you such et C- you siete. Listo de Bess et C- you siete. Listo de Bess et C- you siete. Listo angle de Nacol. Larbanages de Bascoup, Pe	Broselles Gand Hoy Huy Gand Arrers Glegeleen Lieud Basselles Chacelet Mariemon	Filame Fah, de papter Fonderle Filame Conn., de machines Sucorie Ilam farencao Papeterle Thiriro Charhatnage Charbonnage	-	150 60 60 60 17 60 18 80 60 60	
	E:	SPAGN	E		1	
Lab	rates	a Carraca lambagens Madrid Risigardo Madrid	Arrend Utine Gett	15 4 20 21		

LA LUMIÈRE PRIORE

ноиѕ	VIĻLES	NATURE DES LOCAUX	TYPE M	NOMBRE
	HOLLA	NDF	, ,	
Kramopelski,	Amaterdar		1 1	cz
Vester Socketsallendery Spakler et Tonerode	-	Minoterie Sucrerie		78 378
De Pesters Korr es Co	Rotterdare		П	45
Leesmescum Wester Suckerrellandery. C. A. Spin et Zoon	=	Salle de lecture Sucrefie		16 60
C. W. Schenchares Station centrale Station centrale.	Groeingen Amsterdam	Imprimente "Tissage Station coorrale	١.	60
		- 1	i.	900
	ITAL	IE .		. 1
Station centrale Benigno Crespi Benigno Crespi	Milan Vaprio	Station centrale Filature de coupu	- 1	00 55
Gleseppe Crespl et C+, . Cavalleri et France Disconto Miniro.	Vigerano Balogno	Henlio & vapeur	- li	80 10 60
A. Poest	Pise Solblate - Nobbinso	Fibrice de tians	1:	
III Conuncile fu Pictro aneman et Wepfer eduzer et Co	Potdenane Necles	Mostin'à vapeur Filiature de come	1 6	
respi et C* zgoste Yexeler Sirio " Société Raggio.	Nembro Linourne	Moulie à vapeur Filseure de coten Villa	1.1	

	1		17	-	-
NOMS	VILLES	NATURE	18	31	DE CLINE
	111.6.65	OFI LOCAUS	, la	8	₹ 3N
			ı,	2 3	4 -
		1	_	- -	-1
Cluseppe Crespl et C	Cassole	Pilature de cotos	-1	-	۰l
Scense Gistacodi et C	Chies	liulissie	٠,		10
Glovened Monti	Tevastico	Filature de sole		-	26
Canaplficio Vereto	Trévise	Plature de chassy			
Constitute Venesiano	Asba	Pilature de laine			6
Giacomo Nissire	Veolse	l'Haurre de corre	٠,	1 10	
Formed afte Steel	Pine Sleet	l'abrique de tion	15	Li	
	2164	Foor & briques	1	10	
	RUSS	112			
Cancas et Mercue	S. Voles	Steamer			
Morahi.	Tagantog	Mentin	1	1:	
luscheson et C+	Moscon	Editor	1	100	
bemin de fer	Konosep	Gare	1	130	
enbisky	Okoslowka	Fabrique de suca	1	16	
	Crosstadt	Fab. de meubles	1	6	
oujon.	Mescoa Mescoa	Rafferrie	ı	1 1	
legerols.	Ingerols	Filature	1	6	
tics.	lelacgions	Papeteric	1	6	
htson	Yvesky(2	-		60	
	benezerfora	Science		17	
	Weesill	Filatore Mordin	`	800	1
	Jesefour	Sucresie		17	
	Variotic	- Arreste		335	ii
	Riga	Fabrique de ciment		17	1
		Author		10 60	9
	Mescon	Pileture		200	
плорр.					
Beds					,
Lian	Pitenta	Using	- 1	14	1

. LA L	UMIERE	EDISON		53
NOMS	VILLES	NATURE ots Locaux	TYPE PERMAN	NOMESE
R. Farkac et Co Lilpop Reu et Libren-	Donthows	Usine à marhines	_	34
K. Bethi	Variotie	Usine		160
Amamo sa				

		AMÉRIQU		
Whitney Paper Co	Mechaniss-	Fab, de popiera	-	1"
Boston Rubber Shoe Co., Hinds, Ketcham et Co.,		Filatore Counchous Impelment		13
N. Y. et Norwich Lion,. McKee et Fuller,	Catasangus,	Bateaux unpour		12
Seymour, Sable et C.	Pa. Sethwater.	Fab. de wagons		
Pemberson C	Lawrence,	Machines agricoles		251
Africen, Sen et C	Man.	Lafacs	1	127
Breden Block		Art. de Contable		120
Brooklyn Sugar Refinery . Pottstown Iron et Cs	Mass. Brooklyn Pattstown,	Magas., burcaue Raffin, de aucre		137 80
	Pa, East-Cara-	Fondarie		66
Clark, Thread C	eidge, Mass. Sewack N. J. Chicago	Conserves Fabrique de 51 Club Hôtel privé		110

NOMS	VILLE	NATURE Bus Locas		NOMBRE
Gazette Publishing Co., Fall River Beachery	Daverport,	la. Jonesi		110
Herrime Hife Co Ledd et Lagen Hattlifessen et Welchen	Lowel, Ha San Franch Jersey Ch	Einehlmerie ze. Impelmerie		£5 210 60
Boston Sugar Referry.	N. J.		+	300
Atlegten Mile	Passaic Lawrence	Sec. 1		135 65
John V. Ferwel	Chicago	J. Filstuse Trifficeie Drapesie	1 1	130 75 130
Neach Co. Carr et Hobine William Strange, Cooke Locomotine et Ma-	Bergen Poin Peterson, N. J	Machines agricule Seicries	1. 1.	60
Sperry of Barnes	New Britain.	Locomocirca	П	6
E. S. Jaffrey et Co	Ct. Eccadway and	Conserves		-
D.F. Beiny.	Legented street	Drapeste	Π.	
American Bunknese C	N, Y. Liberty street	Orgues, planes	1 1,	
Oregon, Rallway and No.	N. Y.	Impressico de billeto de banque	,,	
Agazios	Portland Docks	Docks	46	

LA	LUMIER	E EDISON		5
ноиз	VILLES	NATURE OF LOCAUX	TYPE 10 DYLAND	NOMBRE DE LANYES
Manhattan Railway Co.,	. ofth atr. an	,		
	Ird avenue	Ateliers de chemic	1 1	
	V. V.	de fer	1 1	
Oregon Relivey and Na	Oures of	W 167	1 1	135
vigetico C	Perific	Vapeur	1 1	
Merrick Threat Co	Highroke, Ma	L Pabrique de fil	, ,	950
Max Ams	177. Green			24
	with street	.1		1
	N. Y.	Conserves	1 1	4
Mittel Ventione	Boston, Mass	L Italia		61
Worambo Hig C	Linbon Falls,		1	",
	M. E.	Filature		150
Nation et Drepfes,	rofth str. an	4	1 1	·~
	East River	Grafu, et feject,	- 1	125
Allred Dolge	Little Palls	Tables d'harmonie	- 1	~
		pour planes	- 1	126
Tiegne, Heuse et C'	Clenville,		- 1	- 0
	Corn.	Drsperie	- 1	110
Paleser House	Chlugo	Hécet	- 1	60
R. H. Coleeum	Cornwall, Pa.	Fonterie	- 1	60
enses Harrison	Newberg,		- 1	1
ares Taylor	N, Y,	Filature	1 1	116
riyer	Newturg, N. Y.		- 1	- 8
Second Room	Washington,	- (J,	135
	D. C.		J	
land, McMally et Co	Chicago	Impe, de l'État		
uldwin Losers, Works.	Philistelphia.	- 1		
Works,	P. A.	Locemetics .		- 1
C. Durant,	Blue House	Loceneties	- 1	75
C. Durant	tain Lake	Hitesi	- [- 1
B, Stetsen, et, C+	Fourt and	mesti	1 1:	25
	Montgomery	Chapellerie		. 1
			1 12	

LA LUMIÈRE EDISON

		-	-	_	-	_	
	NOMS	viia	NAT DE LE		TYPE DE PERSON	NOMBRE	1.
	Marshall Fleld et Co J. Plerpost Morgan	36 tb. 11 and Hall	ect	#fe		60	
ı	Pemberson Mill Co		Y. Hidsel part	loster	- 1	100	
ı	Wensalo Mg C*	Mass, Lisbon Fai	Titue.	⇒.	-	250	
į.	W. M. Singerly	M. E.	7 -	- 1	- 1		
и,	Inder Kaltring C.	Phila Reco	ul Journs	. 1		112	
K a	E. Martie.	Hudson, N.	Y. Tricotes	to		160	
	II. Everen.	Anamosa, Iowa 98 Bassiay	Phone	ler	- 1	50	
ľ۸	colour of Maria	N. Y. Chicago	Isasel		1.	10	
		Passtucket	Thiline	- 1	1:	10 .	
ľ	urel Leke Mill	Fell River.	Fitatore	- 1	1 1	10	
	iter Cation Co	Mass, Pawrocket.	-	-	1.		
J.	Hood Wright	R. L. Fort Washing	-	- 1	30		
Na	fional tube Works	ten, N. Y.	Filatore	- 1	14		
Wi	sons Mil C+	Pa, Wisone,	Tuyasterle	-	1		
jan	es Gordon Beensest	Minn.	Minoscela		1,20	1	
s. 1	1. Brerett 8	rtoues 4 Chethem	Yacht	1	130	1	
	Battle 6	eet, N. Y.	Hotel	1.	١.	ı	
om.	Rolling Stock C. U	rberu Oblo	Fab. de wagon	: H:	130	1	
wig	perior C S.:	S. Columbia	Vapeur	11	120	1	

LA LUMIÈRE ÉDISON

NORS VILLIS STUDIE STUDIES STU

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NAVIRES ÉCLAIRÉS PAR LA LUMIÈRE ÉLECTRIQUE EDISON

ноиз	CLASSE	PROPRIÉTAIRES	TYPE 24 CTRANO	NOMBRE DE LAMPES
Tuesten Albarea Albarea Albarea Sergia Sergi	Cultural Garde plate Transport Cultural Paquebes Paquebes	Marine des Étan-Usia Marine regule regides Marine regule delicere Marine regule delicere Marine regule delicere Marine Pattic R. R. C. Occusto Stemuloje O No. T. c. to Norredo Line Fall River Line Ballinere General College Marine Delice R. G. Marine Pattic R. R. C. Marine Pattic R. R. C. Marine Delicere Marine del		150 150 400 400 400 400 60 60 60 130 130 130 130 130 130 130 130 130 13
Clan Mae-Arthur.	- 1	Clan Line		50

LA LUMIÈRE EDISON

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номѕ	CLASSE	PROPRIÉTA	IRES	14 FF 84	NOMBRE
Clan Mac-Secoch, Hitterwa Apolsh, Adeldud Torres Torres Patena Pa	Paquebat	Cisa Lin Gampagie la P Actività S. S. Pedinidire et Go Corregado Re National Bouilles New-Zeshard Slép ————————————————————————————————————	inense . O ienal C teggio Nav. C S. S. C		#500 #800 #500 #500 #500 #500 #500 #500

IMPRIMERIE CHIEK, 10, RUE BERGLER, PARIS. - 20835-4.

621.309 1885-02-

Paris, Février 1885.

SOCIÉTÉ ÉLECTRIQUE EDISON Société anenyme au capital de Un Million de francs

PARIS. - 8, rue Caumartin. - PARIS

ÉCLAIRAGE

VILLES, RUES, ÉDIFICES PUBLICS & PARTICULIERS Châteaux, Magasins

THÉATRES, USINES, MUSÉES, HOPITAUX, CAPÉS, ETC.

CONSEIL D'ADMINISTRATION

M. ALF. CHATARD, président. EON, vice-président. M. Louis RAU, admi MM. J. P. BAILEY, administrateur.

BATCHELOR GRORGES LEBEY GHARLES PORGES, #

DE PARVILLE, # LE VICONTE SERURIER

LISTE DES ÉTABLISSEMENTS ÉCLAIRÉS

PAR LES

Lampes EDISON

			×
		1	'
	FRANCE		
Hôtel de Ville	Paris	Solles et Jansusl	610
Banque de France		Impr. et boreux	1200
Galeries G. Petit		Expest, de tablesux.	200
M. Ch. Porgis		Appartements	120
Hotel Continental		Restaurant	60
Ga Magasius du Louvre.		Bureaux	69
Maison Boissier		Magasins	110
A. Laloure		Imprimerie	89
Museu Hachette		Ateliers de rellure	409
lléberlé et Loidé		Fahr, de plumes	60
II. Pochet	-	Verrerie	17
II. Lecouteux et Garnier.		Bur, et sall, de dess.	35
Venve F. Petin		Chocolat. Caves	90
Polret frères et nevens.		Laines et cotons	120
Patay		Fabr. de fleurs	25
IL Menier		Yacht	50
Crédit Foncier		Banque	100
Diorams			260
Gagne-Petit		Magasins	560
Société Saint-Réquier		Minoterie	50
Café de la Palx		Café	110
Opěra		Théatre	350

	NOMS	VILLES	NATURE DES LOCAUX	NOMBRE de LANTES
	Écolo Controlo,		École	200
	Jeennu		Bistillerie	50
	Musée Grérin			310
	A. Beuvolst		lirasserie	17
	Derei		Vermicellerie	204
	Ducloux		Ateliers	25
	l'elret frères et neveus		Laines ot cetens	200
	David et Hast		Fil. de eschombre	200
	Hippolyto Gregort Locomto Lequence		Fliature	200
	Celistrean fils			95
	A. Loprério, Largelie-	Angers	Distillerie	25
	Joubert et C*		Constr. do mochines.	190
ı		Angeuicme	Constr. de macmines.	
ı	G. Dantler	Annensy	Megisserio	17
ı	Bulsset fils	Argenteun	Cirtemperie	25
ı	Parfait Dubais	Automo	Constructour	910
ı	R. Loeffel et C*	Avesoes (Aoni)	Filature de laines	400
ı	Muurel Prom et Munrel	Biblinville	Fliature de cetens	410
ı		n	Hullerie	150
1	P. Dandleelle fils et Con.	bordeoux	Hundrig	100
ı	din ninė		Fab. do conservos	120
ı	M. Bussy		lising	204
ı			Tissage	910
ı	Th. Diederlehs	Bourg-ue-11112y	Tissago de veleurs	120
ı		Dean Som	Tennerie	95
ı	Mossant frères	Dt de Direce	Fab. de chapeaux	17
ı		Carny	Using,	95
1	J. Reger	Carressenne	Fob. do mochines	99
1	Ch. Colligra	Coteeu	Tiss, do laines	150
1	Tefilin ct Cit	Candry	Fleture	. 33
1	Raguet et Ci-	Chouny	Filature	17
1	P. Fourré	Cornec	Vins ot alcools	77
1	Ph. Bazin.	Condé-s/N	Filature	73
1	Léon Bazin	- /	Flioture	25
ı	Ch. Beisscaux	Confiandey	Papeterio	120
1	Yve JM. Aussedet et Ci.	Cran	Filature	120
1				150
ı	Cl. Norteux	Dijen	Coeffserie	17

NOMS	VILLES	NATURE ORS LOCAUX	NOMBRE
Cashe. Usine Eldertine. Dortlay of Remage. M. do Botterinidis. L. Seurage. Hilbout et C'. Ch. Bolla Grande Clauterase. Solai febres Outheelin-Claimaire. Courtin Chigner Series et C'. J. Bolder et Poulle. Prits Kocklain et C'. Perric, Penharut et C'. Leneiro.	Enux-Beunes Emmerin Essennes Ferrières Frives-Lille Flers Fournies Fourvoirie Gemeetes Genouille Geurney Groudris Grenohie Héricourt	Catteau. Filature Bistillerie Filoture	17 34 25 160 120 200 200 35 200 17 40 20 104 20 17
Ch. de Moniguitire et C. Andréa novue A. Cheppée. P. Ligneid fils Jilines des. Jilines des. Bédeitre pire et dis Bédeitre pire et dis Bédeitre pire et dis Reyer de Chevalient Marius Chevalient Nayer et Chevalient Armond et Pittel Armond et Pittel Bidenee Charle Jilines et J. Maiet. Armond et Pittel Bidenee Charle Jilines de J. Maiet. Jilines Charlin Jilines Charli	Jarménil. La Haye Dere. La Tourd-n-Pla Lo Yourd-n-Pla Lo Mons. Lons Lons Louslids-Porret Lilie Litieux Lyon	Mineterie Mices Soroccerie Flicture Apprêts et meires Ateliers	250 200 40 40 40 25 50 40 20 230 120 50 200 100 201 100 201 100 201 100 201 100 201 100 201 100 201 100 201 201

- 3 -

NOMS	VILLES	DES LOCAUX	NOMBRE LAMPES
Harthas et Benbemme	Mazamet	Fil. de Laines	17
A. Bru et Cla		Laines et peaux	17
Dovid Mellaler		Appréts d'ételfes	25
Alba Laseurce		Fab. de drops	0.0
A. Bratme et C*		Brasserle	17
		Art. do voyages	120
	Menville	Atollers	100
	Monteeau-lis-M.	Mines de Blanzy	17
	Narbenne	Vins	17
Vve Raywood et C*		Fab. de carrelages	27
	Neauphle-le-th.	Distillerte	17
	Severs	Constructeur	25
Alb. Menler 2	Scullly	Hôtel part	120
	Sœur-les-M	Mines	200
	Voisiel	Checelsterle	25
Victor Poters	Somery	Filature	200
Belente et Forget	Disseau	Atellers	200
horallor frères	Orléans	Fab. de couvert	17
Bessaux fils		Vinalgre	. 17
Stintoln frères		Con0scrie	17
Vic Th. Held fils, freres		Ateliers	100
et C* P		Censtr. de machines	17
igocho fils P		Filature	25
. Bardon et fils P		Papier à elgarettes	6)
		Faienterie	60
I. Potit et C P		Filature	100
	ent-Autheu	Filature	150
rassellion et C+ P		Atellers	25
icehe-Penthus R	legny		17
L Bailly fils	elms	Bijeuterie	25
inthony, Morles et C* R		Filature	120
bredet felore a state	othel	Atellers	17
lanchet früreset Kleber. R		Papeterie	80
erest of DeschaupsR		lissage	25
Involet Ale	7		200
hapelet fils Ro	ectetort	Ustric	62
enderius	emily		25
nisine of Peissonnier Re	enbalx	Pilature	25

NOMS	VILLES	NATURE DES LOCAUX	KOMBRE
Motte et Blanchet	Roubalx	Filature	50
Ch. Pellet			300
Longiro et Dilible			500
Mette et Melliasoux		Teinturerie	440
Leuis Lefebyro		Filature	300
Auguste Lenoutre			300
Amédée, Prenvost et C.			150
Metto Bossut fils		Filsture	130
Wlbaux-Florip			(0)
A. Fahr	Reuen	Deign	60
Le « Labrader »		Vapeur	50
Bavey, Bickford, Watson			
et C*		Miches pour mines. !	50
	Вио	Usine	23
Fenderie de l'État	Ruelle	Fonderie de canons.	210
Pondrerie de l'État	Saint-Channes.	Pendrerie	60
Société des tresses et lacets :	Saint-Chamoud	Passementerio	120
. Th. Véron	St-Bidler-h-St.	Fabrique de papiers	
Sebmitt fils	Saint-Dié	Filatore	-
	Saint-Étlenne	Usine	69
ambeyron et Chavanno		l –	25
l. Burnfeur			17
cssy frères			95
Engêne	Soint-Manr	Fabrique de consert.	17
oudrerie de l'État S	Saint-Ponce	Pendresie	
. Odiaux			17
roemé		Tissus de coten	60
'avid, Treuiller et Adhé-		1	
· mr			60
aucher et Ci		Filature	100
imb Babola S		Métlers à tulle	50
uillermin et Blanci		Fllature de soie	25
baraire fils S		Imprimerie	45
clamme et Ci	iceliu	Distillerie	25
compagnie françuise du			
Cellulo6dS	talus	Ateliers	'60
es Fils de Gulllaumet S			
ordes, Huilland et C*		Ateliers	-120
hatelard, pêre et fils T	arare	Metters à mousselime.	- 50

NOMS	VILLES	NATURE DES LOCAUX	NOMBRE
Socièté Industrielle pour le Schappe. In Schappe. In Schappe. In Schappe. Serve de Comment of C	Teney (Alu). Thnon. Thron. Terpos. Terpos. Torpos. Torpos. Torneling. Touroding. Yasoul Yasoul Yersailles. (Jenno (Istro). (Jif (Istro). Jillefranche(S.)	Blanchis, et Telatur, Pergenge	50 95 17 200 200 200 600 400 60 25 25 25 120 240 240 25 25 25 25 25 25 25 25 25 26 27 27 28 28 28 28 28 28 28 28 28 28 28 28 28

BELGIQUE

De Smet et Dhanis Gonti	300 60 300 60 00 80 80 80

	-7-		
NOMS	VILLES	NATURE DES LOCAUX	NOMBRE
Cherbennages du Bes- coup	Besceup Termendu Seint-Nicolns Anwers	Convertures entra	120 114 70 17 80

ALLEMACNE

	Cologno, Gnzette	
		1 18
		10
		1 2
		2000
		190
		120
impériale	Dantzie Chantin	191
		80
S. Lindauer at C'	. Counstadt Fab. de corseis	130
Linguistre of Schules	. Strasbourg Électricleus	
Emile Ascharbana	Dresde Fub, du planes	17
G. Schooffee	Groppingen Electricien	250
Gelst Lower	. Groppingen Electricien	17
Goo Andres	. Passau Magasin	17
W Hennes	. Creuznach Fabrique de cuirs	17
John Per Co.	Gerlitz Negociant	17
C Desta Semberger	Neuwied Filature	28
C. Durkopp	. Bleiefeld Fub. de mechines à	
material and a	cendre	31
rantique de sucre	Rositz Sucrerie	250
Brasserie Bohémleune	Berlin Brusserie	60
Fisher et Selge	Posneck Tissage	116
		750
		17
		214
Accordentselie Affinerie.	Hambeury Affineria	17
Spiceker of Cr	Colorne Plactricione	17
Hesenfeld et G	Berlin Pab. de Bueleum	78

NOMS	VILLES	NATURE BES LIGAUX	NOMBRE &
NOMS Deuntsalanus friest. Fishriepus dus prajuir. Lisine la grat. Sichelus. A. Hatilanen. Sosterrie. Missen la grat. Sichelus. A. Hatilanen. Missenrie. Missenrie. Line al deun deun deun deun deun deun deun deun	Warrenton. Cesseig. Borlin. Abrensbeck. Borlin. Neugerdurf. Neugerdurf. Neugerdurf. Neugerdurf. Neugerdurf. Werden. Carledu. Gaistrew. Borlin. Anlein. Carledu. Milen. Carledu. Milen. Carledu. Franciert. Restreit. Stattgart. Desede. Schattmerg. Schattmerg.		388RV3
Soutsrie E. Lebmann	Cr. Castreso Twnipoteri Dresdo. Westand. Westand. Resteurant. Resleck Nurceaberg Nurfen. Hremoritarem Mellin Bedin	Succerio. Monilio. Suorerio. Electricien Pepateriu. Boriia Chamiler Electricien Filintare. Vapour « Wura a Cuirmad chiaola Successo Successo Successo Successo Statica contraia. Resiammni.	120 250 25 120 17 60 60 100 17 100 150 250 100 50 150

		DES LOCAUX	NOMB
A. Bielschewesky	Bredon	Manthe	100
Unrimana et fils	Minster	Pilatora	. 100
Arsenal	Soundau	Laberateles	100
Spererio	Zulz	Suggests	100
Gober Falkenberg fils	Oustrin	Meulle	95
Jshio blavatrice	Lübeck	Plivatore	60
i, de Kramstu	Frankenthal	Chitteen	150
l'issage de Veleurs	Berlin	Tissage	100
acreria	Haseda	Conscola	200
Ld. et G. Kochliu	Weiler	Filature	50
Socrerie	Melun	Sacretia	200
F. Klesekamp	Munster	Moulin	50
Grand Hötel	Berlin	Hôtel	200
Sucreviu	Itiesenburg	Sucrerie	150
C. Strauss	Schwerin	Restaurant	120
Sucrerie	Lbeleben	Sucrerie	100
. Motard of C*	Berim	Febrique de bengles	150
lliues " Sto-Cécile	Statio	Mines	200
theller	Brestin	Filature	2110
eques Schiesser cercusen et Oldroyd	RESPUESEEL		150
ifá Reth	Sizan,	— dmp	500
runckeen et Konfmann.	amolen	Ca12	50
artmonn et fils	Cettous	Fabrique de drap	200
lôtel de Ville	Deschie	Pilature	100
inererie	Weshum	Bureaux	100
itation centrale,	Beetle	Castles	1800
kenfeld	Hottenheim	Materia Contrain	25
. Dunklenberg	Elberfold	Villa	25
omto Stellberg	Bucken	Pahrin de meshines	100
r. Rettmenn	Burresleinfort	Fabrique de tehne	50
chramm fils	Brombere	Menlin	50
Outb et Hamanu	Cotthus	Paterious de dese.	100
lunt et Schreiber	Jessnitz	Imprimerio	17
Bannert	Leasman	Menlin	50
ayer Loovy frères	Passaga	Usine	50
lankverein	Bannen	Bengue	50
. Kayser	Colcone	Brougest	50
chicipes et Erices	Julich	Papeterie	50

NOMS	VILLES	NATURE DES LOCAUX	NOMBRE da LAKPES
Scelété des Moulins. E. et K. Schneider Jacob Landins Sucreités Hôtel do Villo. Sourceice. Théatro royal G. Camberg. Pandereis M. et H. Magnus. F. Relawen.	Bresinn Berlin Unizea Berlin Protistedi Munich Etherfeld Spandau Konigsberg	Barcaux Banquo Suerorio Suifes et burcoux. Suererio Théstre. Bronzes. Pondrorie. Menuiserio.	100 100 100 200 400 600 2500 50 200 50

AUTRICHE-HONGRIE

R. Auspitz et C*	Raliatez	Sucrerie	330
Graf St. Genois	Czellechanitz		110
II. Frey	Уукосаа		150
Elbegen et Pritsch	Schönpriesen .		150
S. Mases Law. Beer	Brunn	Fabrique de dram.	200
Sigmand Schwerz		Filatura	270
J. Hukel's Sölme	Neutlitschein	Fab. do cluscony	80
Ringhoffer et C	Peag		000
Maschinenbau, Act. Ges.		Constructours	950
Stadttheater	Britan	Thirtiero	1000
Böhm, Nationoltheater	Prog		3150
A. Munk et Sühno	Sisting	Seterio	50
Gree Kinsky	Strvi		90
Hanno Melzisbrik	Kremsier	Eshriana da malta	160
Boron Steinheif	Chutarec	Ataliere	- 60
Wiener Togblatt	Wien	Imprimatio	.210
schoeiler et C+	Czakowitz	Sparonia	920
I. Piske	_	Ciletone	120
		L. 1940-16-1-1-1-1	, 20

	- 11 -		
NOMS	VILLES	NATURE RES LOCAUX	KOMBRE de LAKPES
Böhm. Bodeneredit Ara- tali. Aug. Motthey. Techn. Cewerbe Mussum Cottniffed Triestinn Schooller Gebrudar. Schooller Gebrudar. S. D. Wolf. J. Budg. Susrevie. Pr. Waggerer. Dorblay pleo et ille at Bernanger. Camoorilla.	Prog Grat Wien Triest Brünn Rumburg Zwittau Yschul Plimikan	Imprimerio. Solles de dessin Filature. Fabriquo de draps. Ateliers. Filature. Sucrecia. Filature de soin	120 120 30 260 30 30 120 140 140

	ITALIE	
Municipia di Milano	Milan Théatre	2890
Societa del Teatro Manzoni		367
Societa dell' Uniona	Club	75
Circaio Industr. o Com-		180
mere		43
a C	Ilitel Continents	475
Sig. Chlerichetti		281
> Colombo	Cafá Accademia	39
» Cassoovo		73
Protelli Boscani		133
Sig. Bal	Contiseur	10
> Lofarêt		25
» Thonet	Pabriqua de monbles	21
» Introvial	Horlagerie	18
» Calderoni	Bijauterio	20
* Finzl	Bonnaterio	13
» Matta		8
» Zomeni	- Paropiules	7

NOMS	VILLES	NATUHE DES LOCAUX	NOMBRE
ig. Menti o Nava	Milno	Drognerie	6
» Pettingroil		Papeterio	4
> Gamond		Agenca	7
 Fraucestiii 		Horlogerie	6
* Cario Erbs		Pitarmasio	8
» Carlo Erba		Produits chimiques.	17
 Nicolesco 		Appartements	18
» Ricordi		March, de musique.	20
M. Bonino e figlio		Bljouterio	10
Custraghi Ronchotti			9
Ferrario	=		5
> Vitali			8
» Rizel	=	Apportements Objets d'art	5
» Vertesl	=	Objets if art	10
· Caprettl e C		Cara Birth	03
» Aliprandi		Café Morzonia	7
o Finzl		Boonaterio	8
» Giaclil		Appartement	13
» Caldorcni		Bijoutorio	9
» Celoda		Confiserio	10
 Ovieni		Lingerio	12
» Bonouni		Droguerie	3
 Birughi o Longa 		Bonnoterio	10
Franzetil		Poteries	92
 Picirasanta e C 		Quincalitarie	15
» Beletti		Modes	16
Carebell Duroni e C		Patisserio	15
Nuconi e C Muscu		instr. do physiquo.	0
redito Lombardo	=	Modes	8
kinea generalo	=	Ванирео	12
ig. Comizzofi		Café	69
	Solblute Olene	Pilature	16
	Canonica		207
Husoppa Crespi o C*	Vigerano	=	180
iacomo Nissim	Plan	Tiesamo	305
respi & C.,	Nembro	Winters	118
ratelii Cassapello	Poril	Me-fly	60

NOMS	VILLES	NATURE DSS LOCAUX	NOMBRE
A. M. Cmeti	Nahhima	Filatore	15
Loumann e C	Terine		120
Scerno Gismondi e C*	Saussiertlerene	Ilulierio	15
Bodmer e C	Nanoli	Moulin	80
Amman e Wopfer	Pordenono	Filature	58
A. Traxler	Livorno	Villa	30
G. Montl	Tenzanico	Fllature	16
Società A. Ferraci	Picel	Haut fourness	96
Cnoapificio Venete	Truviso	Filature	150
Cotonodelo Veneziano	Venezia		502
Stabilimenti Pletrarsa e			
GranllI	Napoll	Atelier mécanique	400
L. Houtempelli	Roma	Ateliers do titres	15
Officina Galifeo	Firenzo	Inst. de physique	69
Pigul o Schwarzenbach		Filaturo	18
L. Rapuzzi e C		Moulin	40
Ermanno Mosters	Somma Lomb.	Filature	100
Lombard! Vietti o Ric-		1	
eblardi		Moulin	18
Cav. G. Susani		Filaturo	50
Wild o abogg	Borgone		310
Tito di Gio. Ricordi		Atelier do musique.	100
Societa del Gaz	Bosso		180
Fratelli Melchior	Vicenza	Case	70
Antonio Oltolina	Asso	Tissago	60
Hafanlo Aresa		Moulin	60
Cavalleri o Franco	Itologna		251 450
Municipio di Torino		Théitre	410
Compagnia Raggio		Bitem «Siriu»	177
·			177
Pin o Re		— «Orione»	85
Sacióió dos Esux pour	Diminizzo	3100000	
l'Étranger	Vanualin	Distribution d'ave	17
Fratelli Crespi o C*	Chowma	Elletura	82
G. Crespi o C	Vicantero	Timore	200
Frutelli Cassanello fu			-70
Pietro	Leek	Moulin	. 44
Getenifizie Veuezianu	Venetin	Eilatura	300

	- 14 -		
NOMS	VILLES	NATURE DES LOCAUX	NOMBRE de LAMPES
Gioschino Zopil. Earito Giovanni Lindicio e Campilido Na- ziennio Derrini conto Giulo Regia Merrini Mortos Gianelle e C- Francesco Cervette. Attenna e Wepfer.	Para d'Ydda Geria Minore Napoli Cantaiupo	Atalioredossècanique Filaturo. Tissage. Yaobt « Saveia ». Bateau « Italia » — « Dandolo ». Hullerie	225 50 350 850
Gouvernement	Medald	Arsenal	500 150 44 70
ŀ	OLLANDE		
Krasnepolski Regurnan (do Weitels- tel Regurnan (do Weitels- tel Wester Suckerrafilinader) graker et Telterodo graker et Zoon Or Peters Keey et U. A. COMMUNICATION A. Spin of Zeen A. Spin of Zeen A. Schonbaum Gratho contrait At	Ottordam Interded to the state of the st	ineterio	78 378 145 81 16 60 17 24 00

NOMS	VILLES	NATURE	BRE
		BES LOCAUX	NON

HUSSIE

Albershot Pagamerg Neulis 10	a		
American Pagamera Neurila	Caucas et Mereur	S. Volga Stenmer	80
Minister C. Morrow Filelature 110	Ameraki	Torontor Needly	80
Camaria do fer. Cancello Carte Camaria do fer. Cancello Carte Ca	Hutchesen et C*	Matron Filature	
Denditicky Oktoberdon Delegique de mento Oktoberdon Delegique de mento Oktoberdon Delegique de mento Oktoberdon Oktob	Chemto de fer	Kounten Gara	
Mellers	Denbltzky	Okoniurko Esbeigou de sere	
Semiles	Melzer	Constalt 221	
	Kenalou	Cronstant rate. de membes	62
	Genien	ot-reursusung millinerie	
	cl. T.	Mescou Fifnture	
	C" Ingerois	Ingerois Papeterle	60
			60
Findayam et C* Tamanerfen Filature 90			17
Arpper West Mealin 17	Finloysem et C.	Tournerfors Fliature	
7- Jesufon Joseph 2016 Barrein 200 Bernein et C. V Versevin 117 Bulchill, Illiga Fairiqua de cliuset, 200 Claum et Mercan Astradam, Astider, 00 Delho Moscou, Filatere 250 Delho Moscou 250 Delho	Arpaies	Wortvill Moulle	
Dernation et C. Vernavia Smitchill Riga Fabrique de cinust 20	Cle Jesufow	Incofess: Guerrale	
Saichell Riga	Bernamu at Cit	Vananta Gurraria	
Astracion. Astronom. Astro	Smirtuit	Tersovia	
Koops	Course of M.	Riga Fabrique de ciment.	
1. Bede. — Usine. 34 250 250 26c	saucis et atercur	Astraciou Atelier	
1. Bede. — Usine. 34 250 250 26c	L. Antepp	Muscou Filature	250
Light 940	1. Bede	Heine	34
itemeilSt-Pétersburg Moulin	J. Liszland and a constant		200
. Listi Moscou Constructour 120	stremott	St-P/ter-hemry Monlin	
Vawofberg Varsovie Banque 60	i. Linet	Vocani Companion	
Tarsone Danque 00	Variableer	Warmer's College Willell	
		varsovie banque	

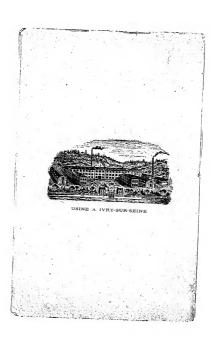
DANEMARK

A. Bercherst	Copsultaguo Fateique dollqueurs.
Kemp et Lauritzen	—Électricien

NOMS	VILLES	NATURE DES LUGAUX	NOMBRE
	SUÈDE		
Palais du Roi	Stockholm	Palais	100
	ROUMANII	Ξ.	
Thöltre Ephorle	Bucharest	Clicatro	1500 750
-			

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Societe Industrielle & Commerciale Edison [not filmed]

This folder contains printed material issued by the Societe Industrielle & Commerciale Edison. Organized in Paris on February 17, 1882, this company manufactured electrical equipment for European markets.

The following item has not been filmed: "Statuts" (1883). An English translation can be found in D-82-038 (Document File Series).

Deutsche Edison Gesellschaft

This folder contains printed material issued by Deutsche Edison Gesellschaft. Organized in 1883, this company marketed the Edison system of electric lighting in Germany.

The following items have been filmed:

- "Das Edison-Gluehlicht . . ." (1883)
 "Elektrische Beleuchtung von Theatern . . ." (1884)

The following item, also found in D-83-037 (Document File Series), has not been filmed:

"Memorandum of Agreement" [incorporation papers] (1883)

621,3269

VERÖFFENTLICHUNG DER

DEUTSCHEN EDISON GESELLSCHAFT.

1.

DAS

EDISON-GLÜHLICHT

und seine Bedeutung für

Hygiene und Rettungswesen.



BERLIN. Verlag von Julius Springer 1886. Verleg von JULIUS SPRINGER in Berlin N.

Bereicht Best die weutstellifteite benommte auf der Bullere Gestebessentling in Johntip. Henungsphon von Dr. L. Löwenheite, Regienun-Bah bei der Käterichen.
Nernel-Eidungt-Kommission, Mil 199 in den Text gelenjeiten Heisenbitten, 1816,
Peris M. so.

Berfinger, A., Krilische Vergleichung der eielzeltschen Kraftübertragung mit den gebrüschlichnie grechanischen Uebertragungssystemen. Gekatinte Preisschrift, 1833. Preis M. 2,00.

Bernstein, Alex, Die eiekarische Beieunbeng. Mit is in den Text gedruckten Holeschnitten.
150, Preis M. a.

Diel, Dr. Jelles, Der Elektromponismen. Mit 170 in den Text gedockten Heltschillten.
154a. Petis M. to.
Ueber den Einfluss der Dimeniscon den Eisenkernes auf die Intensität der Elektroingenten. Der Kapprinsonial-Unterreckurg. 186a. M. t.

Baggette, 2001 Europentenne-Omeriventure. 1985 Au. 1.

Dit Answering des Dichtersgefersten mit besondere Herickskritiging der seutren Telegrapite und der is der Deutscher Telegrapite-Verwähring bestiebelen Elndebrungen. Zweite verlichtigt und entwicklichtigen der Erwissen um durer Berückskritiging der Freise schritte der Wissenstahl ergänist Antage. Mit 431 in den Test gedenskrit-Hedrickslichtiging der Statisten der Wissenstahl ergänist Antage. Mit 431 in den Test gedenskrit-Hedrickslichtiging der Statisten der Wissenstahl ergänist Antage. Mit 431 in den Test gedenskrit-Hedrickslichtiging der Statisten der Wissenstahl ergänist Antage. Mit 431 in den Test gedenskrit-Hedrickslichtiging der Statisten der Wissenstahlung der Statisten der Wissenstahlung der Wissenstah

v. Flecher-Treuesfeld, R., Keige-Teiegraphie, Geschleißebe Entwickeiten, Wicksupekreis und Organisation derstellen. Mas hänge, Wissen, 5 Bauge, Tricke und 26 Hob-steilsten, Freis M. C.

schilden. Preis M. 6.

Geschichte, Die, und Estwickelung des elektrischen Fermsprechwessen. Zweite vermehete und erganne Anflage. Mit zu in den Text gedrackten Holtschulten. 1800. Preis M. 1.00.

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Zu beziehen durch jede Buchhandlung,

ĎΑS

EDISON-GLÜHLICHT

und seine Bedeutung für

Hygiene und Rettungswesen.



BERLIN.

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INHALT.

١.	Beleuchtung	und	Luftverderbuiss				•		٠				
и.	Beleuchtung	und	Schädignug der	An	ge	n							1:

- II. Beleuchtung und Schädignug der Angen 18
- III. Die Fenersieherheit des Edisen-Glühlichts

Entspricht die kanstliche Beleuchtung nuserer Wehnränme, der Schulzimmer und Hörsüle, der Theater, der Cencerthallen, der Fabriken und aller der Raume, in denen sich zeitweilig viele Monschen aufhalten, den Anferderungen der heutigen Gesundheitspflege? Nein! — Die geographische Lage der Länder, welche als Culturstaaten die Führung haben, bedingt die Zunahme der danklen Tageszeit in den Herbst- und Wintermenaten und zwingt die Culturvölker zur ausgedehnten Auwendung der künstlichen Beleuchtung, damit auch der Theil des Tages ausgenntzt werden kann, welchen die früh eintretende Dunkelheit der Arbeit entzieht. Nur durch die Verlängerung des Tages durch künstliche Belenchtung ist das rasche Anfblühen der Cultur möglich geworden, ebense wie ihre Entwicklung gleichen Schritt mit den Verbesserungen auf dem Gebiete des Beleuchtungswesens hält. Eine Rückkehr zu der Beleuchtung, wie sie im Aufang dieses Jahrhunderts gebräuchlich war, ware gleichbedeutend mit einem Rückschritt in der Cultur.

Das Lichtbedurfnies hat sich allmätig gesteigert und dem Verlangen und vernenhret Heiligkeit ist durcht ich jetzt allgemein gewerdenen Arten der Belonchung Rechnung gebragen. Gleichzeitig bei hat die Vernenhung und Verstirkung der Lichtqualten Urbeistätude im Gefolge, welche die mederne Gesundheitsehre auf Grund strong wissenschaftlicher Unterschungen fensteille. Es sind diese die Verderbuiss der Laft in geschlossenen Raumen durch Erwärmung und durch Zufahr von schaftlichen Predukten der Verbrennung, sewie der nachtheilige Einfluss der gebrünchlichen Lichtquellen auf die Augen.

I.

Beleuchtung und Luftverderbniss.

Die Ueberhitzung geschlossener Räume durch Gasflammen ist eine zu bekannte Thatsache, als dass sie mehr als eines Hinweises bedürfte. Nur mag hier darauf aufmerksam gemacht werden, dass der Anfenthalt in solchen überhitzten Rünmen und der Austritt in das Freie, namentlich im Winter, den menschlichen Organismus einem Wechsel von Temperaturunterschieden aussetzen, der in häufigen Fällen die Veranlassung zu Erkältungen und Krunkheiten wird. Eine ganze Reihe der Winter-Siechthümer muss der hehen Temperatur zugeschrieben werden, welcher der Mensch in den zwar gemigend erhellten, aber zugleich überhitzten Räumen zeitweilig sich aussetzt. Unsere Theater, unsere Cencertsale, die Lekalitäten der Restaurants, der Cafés und der Bierhäuser, wie nicht minder die Gesellschaftsräume der Privathäuser, leiden sammt und senders an Ueberhitzung der Luft durch die gebränchliche künstliche Belenchtung, welche daher den hygienischen Anferderungen der Jetztzeit in dieser Beziehung keineswegs entspricht. Die Erfahrung jedes Einzelnen wird das eben Gesagte bestätigen.

Nieht minder sehiddlich als die zu starke Erwärmung der Luft in geseilossenen Räumen ist die Verderbuiss derselben durch die Verbrennungsprodukte, welche jode Flammo, einerlei ob Kerzen-, Oel-, Potroleum- oder Gasfiamme, unausresekt entwickelt

In erster Litio koman die Kollomatere in Betraubt, die thereil entstellt, we Verleenungen entstränden met die zielch nur von den zur Beinechtung diesenden Flummon erzeugt wirt, sondern auch von dem Mener Jehr hange er zihnen, einen Verbreunungsprocess unterhalt und in Jehrer Ansuthunung Kollensturen auch von dem Mener mit Menesberg gefüllern den durch viele Flummen erbeneitsten Reume verle aller die Luft insofern verseitschert, als Menesben und Flummen derneiben Samentoff entsielnen, den sie in Kohlensture untertern, welche der Luft zurückegegeben wird.

Dazu kommt, dass beide, sowohl Menschen, wie Flaumen zur Steigerung der Temperatur beitragen, da auch der Mensch fortwährend einen Theil der in seinem Organismus erzongten Wärme an seine Umgebung abgiobt.

Das Unwohlbefinden mender Perseaus in geschlosseuen, nierbrillten und berritten Binnen, weden sich nierbrillten und berritten Binnen, weden sich wir hen her hen her der Gemeinstellt des Einzelnes und men der Gemeinstellt des Einzelnes und gegenn kann, has sich gein dem des Einzelnes und gegenn kann, has sich gin dem viele Flammen brumen, ist die dernrit, dies zie schädigund auf die Gemufdelt der Arbeite einwirkt, limme die Spumhurft minut, wedels im Ernritten, dies zie schädigund auf die Gemufdelt der Arbeite einwirkt, dies zie schädigund auf die Gemufdelt im Thätigkeit erfordert, und sie elauf macht. Dasselbe gilt von Hörselse und außeren Versamlunigsporten und sonit ergichte sich, dass die Arbeit, das Ringen mech Wiesen und Erkenntniss mud selbst die Erkolmig, wedelse Kunst und gesellig Vorrittgung gewähren sellen, insofern als sie des durch die übliche künstliche Beleuchtung verlangsten Tegen bedurfen, mit Ambpfarung des Wohl-

befindens und gar häufig der Gesundheit erkauft werden missen.

Zur Abhilfe dieser Ubdolstande ist seit langer Zeit die unservielende Zufthur von frischer Lanft durch Voultständ vor geschlagen worden. Es hat sielt aber lerarasgestellt, dass eine anvreichende Zustländen ungemeine Schwiereigsiehen abheitet und dieselbe nur durch maschindle Eurrichtungen erzielt und dieselbe nür durch maschindle Eurrichtungen erzielt worden kann, wochen nit Zosten verbunden siud, weeshall dieselben bis jests nur in einigen Theatern und übnlichen Zwecken dienenden Lukhalen gefünden werden.

Ganza unders und vortheilbafter gestalten sieh jedech die besteht werden, welche uns gewinge Wieme untvieleln releuktet werden, welche uns gewinge Wieme untvieleln nud weder Sanerstoff verbrauchen, noch der Luft Verennungsprochtet zu fültrer. Alsham ist es auch möglich, durch verhältnissunssig einfache Veutlätzinsvorkeltrungen der Groferteilen Luftwechen zu bewertstelligen und med dieser Richtung hin den Auforderungen der Hygiene Rechnung zu tragen.

Eine Belenchtung, welche die eben genannten Vortheile bietet, liefert das elektrische Glablicht.

Elle wir demeslben unsere speciale Aufmerksauheits widmen und seiner nuderweitigen Vorralge gedeuten, ist es notilweutlig, den Einfluss der gebrünehlichen Beleuchtungsarten auf die Laft hinsichtlich der Erwärnung und der Verunvinigung zu bestehten. Benertet sei noch, dass unter dem Austriust, Özlorfe' diejenige Wärmenunge zu verstehen ist, welche einem Klichergamm Wasser augeführt werden muss, um dasselbe um einen Grad Celsius zu orwärmen. Eine Calorte gilt als Witrnesiaheit.

Indem die verschiedenen Lichtquellen in Bezug auf die von ihnen entwickelte Kehlensäuremenge und Wärmeeinheiten (Calerien) vergliehen werden, orhält man einen Massstab für ihren mehr eder minder sehädlichen resp. günstigen Einfluss im Sinne der Hygiene, nach deren Lehre bereits die Luft als ungesund gilt, welche mehr als 0,0007 eder 0,001 Kehlensäure enthält. Die durch den Lebensprecess erzeugte Kehlensäure beträgt bei einem erwachsenen Manne ungefähr 201, während ein gewöhnlicher Gasbrenner von 8-10 Normalkerzen Leuchtkraft etwa S0 l entwickelt, se dass eine einzige Gasflamme gegen viermal seviel Sauersteff verbraucht und Kohlensäure liefert als ein Mensch. Ein durch hundert selcher Gasflammen orleuchteter Raum ist daher so zu betruchten, als wenn sich vierhundert Menschen in demselben ehne Beleuchtung aufhielten, und rechnet man die Gasflammen in kleinen Sälen und Zimmern in gleicher Weise als Personen aus, so ist man nicht nur im Stande, sich ein annäherndes Bild von dem Luftverbrauch und der Luftverderbuiss zu machen, sondern wird finden, dass die meisten Gesellschaftsrämme bei starkem Besnehe meistens überfüllt sind, wenn die Zahl der Gasflammen mit vier multiplicirt und als athmende Menschen betrachtet, der Zahl der unwesenden Personen hinzn addirt wird.

In ihnlicher Weise verhalten sieh die übrigen Beleuchtungsarten, mit Ausmahne des elektrischen Gibhlichts. Die für dieselben erfenterlichen Luftmengen, welche zugeführt werden müssen, weun der Grenzwerth der Kollensäture von 1 per Tausend nicht überschritten werden sell, sind aus den folgenden Resultaten⁵ genauer Unternatungen ersichtlich

 Kerzenbeleuchtung. Eine Stearinkerze, welche in der Stunde 11 gr verbraucht und 15 l Kohlensäure entwickelt. bedarf stündlich einer Zuführung von 30 ebm Luft. Es werden ungeführ 106 Calorien entwickelt, welche das erforderliche Ventilationsquantum von 30 ebm um 12,4 Grad erwärmen.

2) Gasbeleuchtung. Ein Flachbronner von 10 Normalkerzen Lichtstänte verbraucht stindlich 127 I Gas, webei 83 I Kohlensature orzegt werden. Diese 861 benöthigen 172 obn Luft. Durch den Brenner werden ständlich 895 Calerien erzeugt, welche die einzuführende Luftmeuge um 17,0 Grad erwähren.

3) Elektrische Bagenticht-Belenchtung. Noch den Angeben von Fontain o verbrennen bei einer elektrischen Begenlichtimmen, welche ein gleichambsiges Liebt von der Stärke von 100 Schnittbrunnern giebt, sätndlich 6 em Kohlenstäbe van 1 quen Quercheitt. En werden abs im Maximum 12 gr oder ungeführ 221 Kohlenstare erzugt, se dass ständlich nur 44 ohn Luft läungeführt zu werden brunchen.

4) Elektrisches Glahlicht. Da bei dieser Belenahme, nicht durch einen verbrennenden, sendern vielmehrt durch einen giltlenden, in einer Glaugleche Influielt eingesellossenen Körper (Kohlenbägei) des Lieht untstellt, so findet eine Ersteugung von Kehlensahru nicht sitzt, auf ist delare eine Laufaffurung für die Beisenbaung in diesem Palle überhaupt nicht forferlerlich. Ferner ist die Winnenstwickelung der Glählampen eine ausserundentlich geringe. Bei einer sätzulichen Erzeugung von 100 Normalkerzun durch Glüthlicht werden nur 290—486 Colorien — dagegen durch einen gewöhnliehen Gasbreuner 12 100 Gelorien — ontwickel.

Verstehende Zahlen beweisen hinsichtlich des Einflusses der Kinstliehen Beleuchtung auf die Luft in geschlessenen Räumen sehlagend die Ueberlegenheit der elektrischen Beleuchtung, speciell der Githlichtbeleuchtung. Bei letzterer findet

^{*)} Breymann-Scholtz, Allgemeine Bau-Censtructions-Lehro IV. Theil

Zn dem verliegendem Capital hat Dr. Ferdinand Frischer aus Humover aulistellich der am (E.—19. Mai d. J. stattgehabten Sitzungen des Verwins für Gesundheitstelenist und des Vereins für Griefliche Geuundheitstyfelen höchst werthvolle Beiträge") geliefert. Dersalbe hat mit 16 verschiedenen Beleunktungsunder eingehende Versunde angestellt und für jede den erforderlichen Kruft- bew. den Materialbedurf, die verzuge Menge en Wasser, Kalbensätur und Warme bestimmt und aus den gefundenen Zahlen die nebenstehende höchet interessante Tabelle swammengestellt.

Für die ständliche Erzeup sind erford	Dabel werden entwickelt:								
Beleuchtungsart	Mongo	Wusser k	Kohlen- saure ebm b. 0°	Warme- Calorien					
Elektr. Bageulicht	0,00-0,25 Pferdest.	0	ō	57-158					
. Gluhlicht	0,460,85	0	0	200 - 536					
Lauchtgas, Siemens' Re-			1						
genarativlampo	0,85—0,55 chm	-	-*)	etwa 1500					
Lenchtgas, Argandbrenn.	0,8 cbm (2)	0,86	0,46	4800					
Zwailachbr	2 cbm (-8)	2,14	1,14	12150					
Erdől,grasserRundbrenn.	0,28 kg	0,87	0,44	3360					
, klaiu. Flachbreun.	6,00 ,	0,80	0,05	7200					
Solaröl, hygian. Lampe		i	1	1					
van Schuster & Baer .	0,28 "	0,37	0,44	3360					
Selarol, kleiner Flach-	1	1	1						
brennar	0,60 ,	0,50	0,95	7200					
Rubol, Carcallampe	0,48 "	0,52	0,61	4200					
" Studirlampe	0,70 "	0,85	1,00	6900					
Paraffin	0,77 "	0,99	1,93	9200					
Walrath	0,77 ,	0,80	1,17	7960					
Wachs	0,77 ,	0,88	1,18	7900					
Stearin	0,02 "	1,04	1,30	8940					
Talg	1,00 ,,	1,05	1,45	9700					

^{*)} Bei den Siamens'schen Regonarativbrannern werden die entwiekelten Gaze nach missen abgeführt und kemmen daher hier nicht in Betracht.

^{*)} Dinglar's Jeurnal 1883 Bd, 248 S. 375.

Aus den Angaben dieser Tabelle ersieht man zahlengemäss, wenig gende die jetzt allgemein gebrüuchliche Beleuchtungsart nämlich die Gasbeleuchtung, im Einklang mit den berechtigten Forderungen der Hygiene steht.

Diese Uebelstände, welebe schen langet deutlich empfunden wurden, bevor ein durch Minner der Freschung wissenschaftliche und unwöderlegische Begetndung erhiebten, drüngten auf eine Reform die Beleenktungsversen, das eine zu wichtigte, zu einsehnsdende Rolle in unserm gesammten Culturbeten spielt, als des ihm soldt von den verseibteinsten Stelten, sewell von der greuchstflich praktischen, als von der hygientschen Auftrarhamkeit geseinakt werden musse, und vermulssehen Auftrarhamkeit geseinakt werden musse, und vermulssehen Theoretiker und Praktiker nach einem neuen Beleenktungsmittel als Erzets für das Gazilicht zu suchen, welches wehl die Tagenden, nicht aber die Nachtheile des letzteren bestese. Als dieses Erzentungten Lastschilcher Misselande erklätzen sich die vielfalenden Bestrebungen, dem olektrischen Lichte Eingung zu versenduffen.

Edison, der genints Amerikaner, war en, der sieh die Amfgebatellte, ein elektrischen Liehe herzustellen, das nieht durch blandtenden Effekt das Gasilekt übertrumpfen, sonslern als Erste das Gasilektse, dasselbe durch eine Esieh vor Vorstigen übertreffen sellte, die in der leichten Hamilbahung, der geringen übertreffen sellte, die in der leichten Hamilbahung, der geringen Warmeneutwiellung, gaustleitem Amsselhus von Sauentoff-vorlenund und Erzeugung von Verbroumunggessen nud in der Vermeidung von Peutengefalte Dosebekon.

Trots untiberwindlich scheinender Schwierigkeiten, trots journer Verhölmung, mit welcher die Oberfäschlichkeit jedem grossen und neuen Gedanlen entgegentritt, liess Edison sich nicht irre machen, soudern gelangte zu dem selbstgesteckten Zeie, zu der praktisch nicht nur möglichen, sondern thatsächlich Vortheile und Vorzüge bietenden elektrischen Beleuchtung mittelst Glühlampen.

Es gelaug ihm die Theilung des olektrischen Stromes in orrefunekter Weise, die Spiesung der Lampen mit Elektricität wur Ochratskellen, die einfendet Construktion der Lampen und die vortheilbafteste Unrwanlung der mechanischen Kraft in elektrische, on dass die Bolonoktung mit elektrischen Glüblampen sich von Tag zu Tag mohr Bahn zu brechen

Schon allein der Umstaud, dass die Githlampe, deven goldiges, klaws Licht das der Gastlamme an Schlucht übertifft, keins Verbrenunngegan liefet, wester des giftige Kollersvydgan noch selverfüge Starrs- und Schwediussenschaftiges, weden beiteren z. B. die Präten werdtroller Stelfs zerstörnund Motallwaren selverlivons, gebon dem Githlichte zur Beleuchtaug von Leden und Magenison den Vorzug vor dem Lenechtgane, dessen freivilliges Ausstrümen ausserdem selnen für zur Vergleungen mit tötlichen Ausgeme? Vorzug zur dem Lenechtgane in den den Ausgemen vorzug zur den Lenechtgane mit deltichen Ausgeme? Vorzug zur den benocht zu Vergrüßungen mit tötlichen Ausgemen? Vorzug zur den bereits vorzuglich bewührt, wie an alen Gitgenden Gutsehten vom Prof. von Pettenkefer, mit besonderem Bosag arf die Hygions, hervorgeht.

HYGIENISCHES INSTITUT

kgl. Ludwig-Maximilians-Universität. München

> Botroff: Belenchtung des kgl. Residenztheaters in Munchen mit Gas und mit elektrischen Liebt.

Bei den auf Ihren und des Herrn Professors Dr. Ernst Voit Wunseli im königl. Residenztheater dahier vom hygienischen Institute vorgenommenen vergieichenden Untersuchungen zwisehen Gasbeleuchtung und olektrischer Beleuchtung wurde die Temperstur und der Kohlensütungehnt der Inst gleich zeitig im Farket, im I. und im III. Range (Gallerie) ermittelt, und wurden diese Bestimmungen sowell bei leerem Hause, als auch während Thesstervorstellungen vorgenommen.

Ich kann vorerst nur auf die Resultate der Temperatur-Beobsehtung bei beiden Belenchtungserten Gewöhlt legen. Die Koldenstureboebnehtungen haben namentlich bei besetztem Hause ein Rosultat ergeben, dessen Constatirung noch eine grössere Anzahl von Vorsuchen und an mehruren Punkten der Theatsor erheiseht.

Bei leerem Hause waren nie mehr als 10 bis 15 Persenen auf der Bühne und im Zusehauermum zugegem, der Vorhaug blieb offen, und wurde sewold die Bühne als auch der Zuschunerraum über 1 Stunde lang in voller Beisuchtung erhalten. Die Temperatur wurde an den genannten drei Stellen von 5 zu 5 Minuten beobschiet.

Bei besetztem Hause waren nach Ausweis der Theaterkasse jedesmal zwisehen 500 und 600 Personen im Zusehauerraume auwesend, und wurden die Thermometer von 10 zu 10 Minuten bechachtet.

Die Temperatur stieg sowohl bei leerem, als auch bei besetztem Hause vom Minimum am Anfang mit gaax unbedeutenden einselnen Gegensehwaltungen bis zum Maximum am Ende, und finden sieh die Zehlen und die Differenzen zwisehen Maximum und Minimum in beifolgender Tabelle (s. Seite 16) angegeben.

Es geht damus zur Evidenz hervor, wie verhältnissmässig wenig die Luft durch die elektrische gegenüber der Gasbeleuchtung eritist wird. Selbstverständlich ist der Unterschied bei loorem Hause am grössten; bei besetztem Hause kommen neben der von den Zuschasern und Mitgeilendem entwickelten Wärnen noch mancheriel Störmigen vor. Der Zuschnaceraum sit vor Beginn der Vonstellung voll bedeubtet, die Bidnen nicht; während des Attes wird die Belenchtung des Zuschnaceraums sehr roducht und die auf der Blune nach Bedinfraise gesteigert; im Zwischennkte undert sielt das Vorhältniss wieder ins Gegentheil un, und Issen sicht diese Umstaderungen quantitäter hield get vorfelgen.

Zum genaueren Vergleich eignen sieh daher streng genomen nur die Resultate bei leeveren Hause, wo velkrund der Versuchsaduaer an der Stärke der Beleuchtung der Bilme und des Zuschauerraums nichts geändert wurde und der Vorhang immer aufgesagen blieb.

Aus diesen Versuchen sieht man, dass bei leerem Hause die Differenz in der Temperaturerhöhung im ebersten Range bei Gasbelsenbiumg 10 Mal (9,2:0,9) grösser ist als bei elektrischer Beleushtung. In den unteren Räumen des Hauses werden die Differenzen selbstverständlich kleiner.

Anch bei besetztem Hauss beträgt die Differenz noch 6 Grade Celsius, indem auf der Gallerie bei Gasbeleushtung 29° C. (= 23,9° Rekammr) und bei elektrischer Beleushtung 38° C. (= 18,4° Rekammr) beobeeltet wurde. Bei elektrischer Beleushtung wur die Temperatur im III. Range (23° C.) nieht einmal so hoch wie bei Gasbeleuchtung sehen im Ir. Range channel se bei wie bei Gasbeleuchtung sehen im Ir. Range (23° C.) nieht einmal so hoch wie bei Gasbeleuchtung sehen im Ir. Range

Es darf noch darauf aufmerksam gemacht werden, dass bei den Versuelsen mit Gasbeleuchtung die Temperatur in Freien einertiger war, als bei den Versuelen mit elektriesher Beleuchtung, so dass also letztere jedenfalls nicht im Vorthein war. Die Kohlensäure der Luft aulangend, kann ich nur bemerken, dass bei leerem Hause die wessenlich nur von den Gasfammen stammend Kohlensäurevermeitung sich gleichfalls in einem älmlich steigenden Grude bemerkbar machte, wie die Temperatur. Zu Anfang des Versuchs war der Kohlensäurechalt der Luft im Zuschaneraum. . . . O4 pro mille

bei Gasbelenehtung nach einer halben Stunde:

nach einer weiteren halben Stande: im Parket 0,6 "

```
" L Rango 1,0 " ,
```

Bei elektrischer Beleuchtung:

Da die elektrische Beleuchtung meh Edison ger keine Kehlensäure liefert, so muss diese geringe Kehlensäurevermelnung bei elektrischer Beleuchtung der Gegenwart von einigen Arbeitern auf der Bülme und von den die Beobachtungen Ausführenden zugeschrieben werden.

Bei besetztem Hause hütte man eine ehense merkliche Differenz im Kohlensturegehalte der Luft zwischen Gas- und elektrischer Beleuchtung erwarten mögen, wie bei leerem Hause, die sich aber nicht ergeben hat. Bei besetztem Hause betrug das beobachtete Kohlensäure-Maximum bei Gasbeleuchtung 2,3 pro mille " elektrischer Beleuchtung 1,8 " "

Die Ursachen des seheinbaren Widerspruchs sind jedenfalls melirere. Dio Kohlensture stammte aus zwei Quellen, die nicht immer gleiokmässig flossen: einmal ven den Gasflammen, dann von den Monselien im Zusehauerraum und auf der Bülme. Akt und Zwischenakt bringen sowohl auf der Bühne als auch im Zuschauerraum uncontrolirbare Wechsel hervor. Ferner ändert sich der Luftwechsel im Zuschauerraum, je nachdem sich Legenthüren öfter oder seltener, mehr oder weniger weit öffnen und schliessen. Ferner bewirkt die Temperaturdifferenz zwischen Theater und freier Luft, z. B. die grüssere Hitze bei Gasbeleuchtung, naturgemüss eine verstärkte Ventilation, wezu namentlich auch der Gas-Krenleuchter im Zuschauerraum heiträgt. Bei elektrischer Beleuchtung ist entsprechend der geringeren Temperaturdifferenz zwischen innen und aussen auch ein geringerer Luftwechsel bedingt, weshalb die von den Monschen erzeugte Kehlensture nicht in dem Maasse wie bei der Gasbeleuchtung entweicht. Die bei Gasbeleuchtung verstärkte Ventilation wird auch die Ursache sein, weshalb bei besetztem Hause der Unterschied der Temperaturen zwischen Gas- und elektrischer Beleuchtung nicht se gress gefunden wurde wie bei leerem Hause.

Aus den verliegenden Untersuchungen lassen sich mit Bestimmtheit zwei Schlüsse ziehen:

 dass die elektrische Beleuchtung im hehen Grade die Ueberhitzung der Luft im Theater verhindert;

2) dass sio allerdings an und für sich nicht im Stande ist, die Ventilation des Theaters entbehrlich zu machen, dass sie aber eine goringere Ventilation desselben ofredert, als die Gasbelonethung, bei welcher die Ventilatien nicht nur gegen die Lertwerderbniss durch Mensehen, sendern ande gegen die Effice und die Verbrennungspredukte der Flamme genichtet werden unus, während sie os bei olektrischer Beleuchtung nur mit dem Athem und der Hautausdatung der Mensehen und deroro Felgen zu thun hat.

Dr. Max v. Pettenkefer, k. geheimer Rath und Professer.

Munchen, den 13. Juni 1883.

Tabelle zu verstehendem Gutachten von Prof. M. v. Pettenkofer.

Temperatur der Luft im Theater.

	Gasbeleuchtung							Elektrische Beleuchtung											
	1. Versuch 2, Mai 83 locres Hens Tempi Freien 11,8°C.			voltes il ana						iV. Vers. 10, Juni 83 voi lee Haus. Temp. I, Frelen 15° C.									
	Parket	LRang	II Bang	Parket	P. Pere	II.Rang	T T	L.Bing	Lkang	Parket	ă	II.Rang							
Minimum Maximum	15,2 16,5		16,9 25,4	16,0 22,2		21,6 29,0	16,6 16,0	17,2 18,0	17,6 18,5	17,6 19,6		18,8							
Differeng	1,8	8,9	9,2	6,2	6,8	7,4	0,3	0.8	0.0	2.0	8.9	4.9							

Besonders ist aus dem Gutachten der Passus zu berücksichigen, welcher betent, dass die olchtriende (fühllichtbeleuschinng eine geringere Ventilation erfordert, als die
Gasbeleuschung was für die Thester gilt, hat auch
Galtung für andors Lekalitäten, und semit ergiebt sich, dass
die Githlahmen ellein im Stande ist, eine Beleuschung gesoliossener Rätzune zu erunglichen, welche luygienischen Anforderungen entspriebt.

П.

Beleuchtung und Schädigung der Augen.

Genaue statistische Erhebungen haben zweifelles erkennen lassen, dass die Zahl der Kurzsichtigen, namentlich auf höheren Lohranstalten, im Zunehmen begriffen ist.

Auf Grund dieser Erhebungen sind die Ursachen der Znnahme der Kurzsichtigkeit aufgesucht worden und Mittel zur Abhulfe in Verschlag gebracht.

Es ist unzweifellaaft, dass beseuders die mangelhafte Beschaffenheit der gebränchlichen Lichtquellen und deren nurationelle Benutzung den meisten Schaden bringen, und leitet desshalb auch Pref. Hermann Cohn*) (Breslan) seinen am 18. Mai d. J. auf dem hygienischen Congresse zu Berlin gehaltenen Vertrag über künstliche Belenchtung, dem wir in dem verliegenden Kapitel viele böchst interessante Daten entnommen haben, mit folgenden Worten ein: "Die Ansprüche,

welche in Bezug auf Verbesserung der künstliehen Belenebtung in fritherer Zeit von sehr hervorragenden Männern gestellt wurden, müssen wohl sehr geringe gewesen sein. Als Beweis diene ein wenig hekannter Vers des grössten deutseben Dichters. Goethe sagt wörtlich in seinen Sprüchen in Reimen (Band III, S. 13 Cotta'sche Ausgabe 1855):

"Wüsste nicht, was sie Besseres erfinden könnten Als wenn die Liehter ohne Putzen brennten."

Eine grössere Erfindung betreffs der künstlichen Beleuchtung wünschte also ein Goethe nicht. Die Dunkelheit der Kerze scheint ihn weniger genirt zu haben, als die Unbequemlichkeit des Putzens

Welche Ansprüche stellen wir dagegen heute an die künstliche Belenchtung? Eine Putzscheere findet sich, höchstens nech als Cariositat in einem Alterthumsmuseum; die Talglichter sind verbannt; die Nacht wird durch das elektrische Licht in Tag verwandelt, und immer nech bemühen sieh die bodentendsten Manner, die kanstliehe Beleuchtung zu vervollkommnen.

Mit diesem enormen Anfschwunge der Tochnik der kflustlichen Belenchtung sind aber die hygienischen Untersuchungen über den Einfluss der verschiedenen künstlichen Belenchtungsarten auf unser Auge leider gleichen Schritt durchaus nicht gegangen."

Die Hygiene verlangt von einer dem Auge nicht schadenden. künstlichen Belenchtung, dass sie*)

1. eine hinlängliche Lichtmenge entwickle,

^{*)} Dieser Gelehrte erhielt auf der Hygiene-Ausstellung wegen sein 7 Dieser Generice etment am der Hygener-massenung wegen schallen graphischen Darstellung über die Zunahme der Kurzsichtigkeit in den deutschen Gymnasien die geldene Medaille.

^{2.} nicht zu groll sei,

^{*)} Wiel und Gnehm, Hilbelt der Hygiene. 1878-1880. S. 427. Schürmann-Eversbusch. "Die Hygiene der Augen." Preisschrift.

- durch Wärmestrahlung sieh nicht mangenehm bemerkbar mache.
- 4. oiu stotiges und gleichmüssiges Licht gebe und endlich
- 5. eine möglichst geringe Luftverschlechterung berheiführe.

Wenn auch zugestanden werden muss, dass die beiden serten Fonlerungen ührth die jeist geleistudlische Zieht-quelle, das Gastlicht, genügend erfüllt werden, die dieselben sehr bestehtlichte Elchtenungen zu licher im Statuch zie bestehtlichte Ziehtenungen zu licher im Statuch zie bestehtlichte Ziehtenungen zu licher im Statuch zie besteht zu den die Statuch Müllelgisteller oder Glocken gemildert werden. Besteht zu den die Statuch zu der den der Statuch zu der Statuch z

Besüglich der Fruge nach dem Minimum des Lichtes, bei webleme das Auge noch arbeiten kunn, seismmen die Ansichten des Prof. Coln mit denen des Fannzeissehen Gelerhren Javal überein, welcher asgir. "Il m'y a done jaumis terep, il m'y a jaumais assoz de lunkfra artifolielle". So lautet dann eine weitere Anfigabe der Hygiener; "Man sehaffe dem Arbeitenden möglichst viel Kantelliones Linkt."

Besonders meshkolitig für die Gesumlacht ist die dem Geslichke netströmende Hitze, welche eins Autrockamp des Auges, Erhikang des Kopfas, Blutandrung meh demesiben mit folgendem Kopfashmerne bewirkt. Vernsche von Frof. Celin haben gezeigt, wie sehrzuch in diesem Funkte das oldstrieben Grühlicht dem Gesilicht überlegen ist. Bringt man z. B. ein berenstes Thermemster 10 me anfern von enlere Gesähmere von 20 Normalierzeen und ein zweites densselolies Thermemeter in demelben Enfernung ver einer zwamigkenrigen ziels einer Gilbähmer, no setzigt bei einer Zimmertemperatur von 14° nach 10 Minuten dar Thermemeter in der Nithe des Gilbilichts um 1937, das in der Nalte des Gasilcites dagegen um 207°, also annähernd um das Deppletlo Per geiche Verende wurde bei einer Zimmertemperatur von 12° wiederholt, und zeigten die Thermemeter entsprechend 11° mal 2826.*

Hierarf wurde mit einer empfindlichen Theorensützle gemessen, die aus dem physikalischen Institute der Univernistat Breslan stammte, und deren Ausschläge verber nicht dem Theremouster vergelichen worden waren. Die Thermessitzle gals heim elektrischen Lichte in 20 cm Eniferrung einen Ausschlag von 45°, dagegen ind Ganickie von 72°. Dr. Gratz, Privatziocent der Physik in Minuten, hat spatzer die Theremossitze geman auf Thermensestergunde übertergen, und es stellte sich hernus, dass diese Ausschläge gazugenun 35° und 6° C. ontsprachen, alse wieder das Veritätinies 1:2 wat. Danus bilgt, dass das Gasilcht bei 20 em Entfornung deppelt se start erbitzt, wie das Glühlleht. Allt weiteren Untermebungen in der Entformung von 'Am ist Prof. Coln noch besehärigt. Dorselbe ist der Ansicht, dass bei dieser Entformung die Differensen noch viel mehr zu Gunsten de elektrischen Lichtes aushlich uftriben; denn in dieser Entformung fühle man beim Glütlicht gur keine, beim Gasilicht aber noch eine guns betrehültliche Wärmen.

Die Empfindlichkeit des Auges gegon Whrms, berüchte Prof. Cellu weiter, seit übrigane bei verschiedenm Personen nach eine sehr verschiedene. Ver 15 Jahren lanbe er die Augen ven 182 Schriffsetzern gepricht und 51½, kunzsichtig geduuden. Bei dieser Gelegenheit liese er sie abstimmen über die Beteutlung, die ihnen am wünsebenwerthesten sei. Nur 72 stimmten für Gas, die anderen 60 zogen der geringeren Hitze wegen od um Detrellenm von

Ven 72 Uhrmachern erwiesen sielt nur 9% als kurzsiehtig. Die Uhrmacher müssen bei ihren feinen Arbeiten die Fhamme gauze besendern anhe, — auf 25 selbst 18 Gen — au das Ange bringen, und in der That stimmton 54 also 74 der Uhrmacher für Oel oder Petroleum, da das Gas ihr Auge zu sehr austreckene.

Nathrich künne man ja die Hitservirkung veeringern, allein bekauntlich niumst die Holligkeit im Quadrat der Entfernung ah, und man misse alse eine derpreile, und selbst eine vierfiehe Menge ven Lieht brauchen, wonn man die Hitse vermeiden und deshe gleiche Halligkeit haben welle. Das alles sei aber bei Githlicht nicht nöthig, da es eben fast gar nicht erhitzt.

Diese und andere Versuche — wir erinnern hier an das oben angeführte Gutachten von Prof. v. Petten kofor—sowie die zahlreiehen praktiselten Anwendungen des Edison-Liehtes laben zur Gonfigo bewiesen, dass die Wärmeentwicklung desselben eine so geringe ist, dass durch dieselbe ein sehidlieher Einfluss auf den menseblichen Körner nicht stattfindet.

Bei Erstreyung der Prage, welchen Schuden die zuckende Aleubeitung den Ange bringt, segt unser malriche örwähnter Gewährmann: "Wenn eine Zhamme uncht, so wechselt die Briechtungsintensitäts ansservedentlich sehnell. Die Netschatt ist aber itt sehn köhne Liebtsmatzenklode sehen sehr eunspfladlich, wie viel mehr, wenn die Unterschiede sehr grosse sind. Wenn nun die Intensitäts es ausserordentlich sehnell wechselt, wie bei den zuekenden Ehammen, so wird die Netzhatt uuf das Zehülchste gewiste, mid die Arbeit ist auf die Daner unmöglich. Welche Vertaderungen dabei in der Netzhatt ver sielt geben, weiss man nech nicht mit Sicherchiet, vielleicht mus and hid & Acconmodation sich dabei fortwährund andern, aber das Eine steht nechtig sein der San zu sechen der helt ist unter Teitrelich."

Ein weiterer Verung der Gibliampen liegt nun aber gerude chris, dass sie abselut rahig rund gleichmategig bevauen, wahrend die gebetrachtlichen Gasflammen fertwelltrund zusehen und faschern. Die Rahe des Giblilitätes in Genenisschaft nit seiner etwas weiseren Parbe laben eine ausserendunt hat den Schaft den Augen wehl, verleicht dess Parben einen besonders warmen Ton und verstücket dieselben weit weniger als das Gastlicht. Die sehr eingeleunden Versuche von Perke (D. E. Meyer in Bresslar (6. centralbatt für Belätzerbennlig) über die Parbe des elektrischen Lichtes geben hierfür den Beweis. Derreitbe hat bestämmt, in welchen Verballung des elektrischen Bagen- und Gibliliafets und des Gastlichtes werd in des gestellt und des Gastlichtes und des Gastlichtes und des Gastlichtes und des Gastlichtes des elektrischen Bagen- und Gibliliafets und des Gastlichtes

And the second s

geschwächt ist, dass die Helligkeit des gelben Lichtes in allen vier Lichtquellen dieselbe ist.

					,	Gaslicht	Elektr. Glublicht	Elektr. Bogenlie
Reth						4.07	1,48	2,09
Gelb						1,00	1,00	1,00
Grān						0,43	0,62	0,00
Blaugr	ün					_	0,29	_
Blan							0,21	0,87
Vielett						0,15	0,17	1,03
Acusse	ret	es	Vi	ele	tt.	_	_	1.21

"Man erkennt aus diesen drei Zahlenreihen sofort", bemerkt Prof. O. E. Meyer zu vorstehender Tabelle, "dass alle drei Lichter im Vergleich mit der Sonne röthlichgelb erscheinen müssen, da sie einerseits reich an rothen, andrerseits zu arm an blauen Strahlen sind, um ihren Gehalt an gelbem Licht zu Weiss zu erginzen. Von den drei Lichtern ist das Gaslicht am stärksten roth gefärbt, das Bogenlicht ist, wie bereits früher bemerkt wurde, im Vergleich mit der Sonne gelb mit einem Stich ins Röthliche; das Glühlicht steht zwischen beiden in der Mitte. Hierauf beruht der angenehme Eindruck, den das Glühlampenlicht auf unser Auge macht. Das Licht der Glühlampe besitzt nicht das in dem Gaslichte vorhandene Uebermaass an Roth, also an derjenigen Farbe, welcher so häufig die Bezeichnung "brennend", "schreiend" u. dergl. beigelegt wird; und andrerseits gibt es nicht die geisterhafte Beleuchtung, welche das Bogenlicht durch seinen Gehalt an violettem Lichte bewirkt."

Prof. Cohn resumirt den Inhalt des erwähnten Vortrages zuletzt dahin, dass es eine Hauptaufgabe der Hygiene sei, die Eigenschaften des Tageslichtes auch beim künstlichen Lichte

möglichst nachzuahmen, da das zerstreute Tageslicht dem Auge niemals schädlich ist. Daher dürfe die künstliche Belenchtung 1) nicht blenden, 2) nicht spärlich sein, 3) nicht die Augen erhitzen und 4) nicht zue ken. Man sei daher den Elektrikern zu grüsstem Danke verpflichtet, da sie gezeigt haben, wie schlocht die bisherigen Beleuchtungsarten waren, so dass ein edler Wetteifer in der Vorbesserung der anderen Lichtquellen nethwendig folgen musste. Der Lichthunger, welcher im Publikum durch die elektrische Beleuchtung erregt werden ist, lasse sich nichtmehrzurückdämmen und das sei gut. Denn durch bessere Beleuchtung werde der Verbreitung der Kurzsichtigkeit vorgebeugt und vielen Augen, deren Sehschärfe nicht mehr vollkommen sei, Nutzen gebracht. Das Hauptergebniss seiner Untersuchungen sei das, dass die Augen am meisten geschädigt werden durch zu geringe Beleuchtung. Der Hygieniker musse mit Goethe's letzten Worten schliessen "Mehr Licht."

Hieru schliessen sich die für die Genautheitspflege im behatten Grade wichtigen Entdeckungen des Beriner Universitätsprofessers Dr. Arthur Christiani, dessen neuste untersendigene sehngen dargelein nichen, das das Licht auch einen hervorragenden Einfluss auf die vegetative Sphire der menschlieben und thierische Leibesohonomie nasubt und zwar in günstiger Weise. Dieser Forseler hat durch eingebende Boehechtungen und Experimente en Thieven die faussend interessentie und bedeutsums Tintanche festgestell, dass bigenschen von den sonstigen Sinnerwirtungen, die Erregung der Schnerven, auch einen ganz bestimmten Thail des Mittalgebirnes, namentlich das von densselben dort entdeckte Athmungseentrum belobt und in gesteigerte Thailigkeit versetzt.

Diesen belebenden, den Athmungsprecess fördernden Einfluss kann die künstliche Beleuchtung jedoch nur dann ungehindert

Von vesseliedenen Gesielsbynukten magedund, koumen Prof. v. Pettenkofer mul Pref. Cehn zu den und demesdben Rosultate, dass nämlich die Deleenkung durch elektrische Ginhampen, sewold in Bezeg auf die allgemeine Hygiene, als auch auf die Hygiene des Anges, Ortheble biech, welche allen außeren Bedeuchtungsurten mangeln, während die neusten Arbeiten von Prof. Christiania ind eine Beleutung des elektrischen Gilhileiten für die Genutheitspaften hinveisen, welche, beider unbekannt, unsemender gewänftigt werden wird, je unfassender die hieuurt bezeiglichen Untersuchungen und Erfahrungen sich gestalten.

Schon allein diese Uebereinstimmung dreier Autoritäten stellt der Edison-Belenchtung ein Zougniss ihrer Vorzüge aus, wie es beweiskräßiger nicht sein kunn. HI:

Die Feuersicherheit des Edison-Glühlichts.

Die znnehmende Zahl grosser Brände hat Veranlassung gegeben, dass in den letzten Jahren bedeutende Anstrengungen gemacht worden sind, Vorrichtungen zu construiren und einzuführen, durch welche eine entstandene Feuersgefahr schnell beseitigt wird. Während hierin thatsüchlich aussererdentliche Fortschritte gemacht worden sind, wie die diesjährige Ausstellung auf dem Gebiete der Hygiene und des Rettungswesens wohl beweist, hat man unseres Erachtens sich bisher viel zu wenig damit beschäftigt, Mittel aufzufinden, um das Entstehen eines Brandes, - welcher schnell von den kleinsten Anflingen die geführlichsten Dimensienen annehmen kann, möglichst zu verhindern. Unzweifelhaft ist es, dass eine gresse Zahl aller Brande durch die Beleuchtung verursacht worden ist. Fölsch giebt in seinem sehr interessanten Buche über Theaterbrande auf Grund statistischer Erhebungen an, dass die während der Verstellung begonnenen Brände, beinahe ausnahmsles durch offenes oder schlecht geschütztes Licht entstanden sind. Es möge hier daran erinnert werden, dass das

gresse Brandunglück 1876 im Brooklynor Theater, bei dem 283 Mensehen unter den Trümmern des Gobündes begraben wurden, durch Entzündung einer Decoration an der Ceulissenlamne veranlasst wurde. Noch in unser Aller Gedächtniss ist der schreckliebe Ringtheater-Brand in Wien, welcher 450 Personen das Leben kestete; derselbe eutstand durch Unversichtigkeit beim Anzünden der Soffittenflammen. Aber nicht nur die offenen Gasflammen geben zu Bränden Veranlassung, vielmehr ist auch eine ganze Reihe derselben durch Gasoxplesionen verursacht werden. Die auf der Bühne befindlichen, meist offen liegenden Gasröhren sind verhältnissmässig leicht einer Beschädigung ausgesetzt; sehr häufig eutsteht Feuersgefahr durch oin Undichtwerden eder Zerreissen der Schläuche, mittelst deren den Versetzstücken das Gas zugeführt wird. Eine derartige Gasexplosion gleich nach Beginn der Vorstellung hatte den Brand des Theaters in Nizza (1881) zur Folge, bei dem 150-200 Personen das Leben einbüssten.

Angesiehts dieser Thatsechen sollte nan nicht mehr zögern, allen den Zhlen, vo die Bedenchung eine Feuengenfahr herbrifthum könnte, die gefahrlese, ginalleh feuersichere (blatient deuerbring von Editeen einzuffahren. Die Editsen-Gilbliampe besteht aus einer hernetisch versehlossensen balbieren Glasglecke, webbe im Innere nichen mit den Stromzeldenigschlichte werbendenen Bügel aus verbolhoer Ennbarfaser enhalt; dieser Kohlenbügel ergilblit und steult! Lielst sen, sobald ein obstrieden Strom im durchfliest. Infolge dieser Construction der Gilbliampen ist es nicht möglich, dass sich ein ihre Nike gebruchter, leicht bermabnere Köpper entstanden inn ihre Nike gebruchter, leicht bermabnere Köpper entstanden inn. Zerbricht die Glasglocke durch Zufall, so crischt die Lampe inföge Verbreannen sie Kohlenbügeles politelich, dass ein Entstanden in unmittelburer Nikob befindlicker, leicht benabere Köpper, wie Versueles geougig haben, nicht einstrikt ein tiltet.

Anch durch die Leitungen kann Feuer nicht entstehen, sobald die Anlage sorgfültig und von einem mit dem Glüblichtsystem gehörig vertrauten Unternehmer ausgeführt werden ist. Um ein Glühendwerden der Leitungen in Felge zu starken Stromes zu vorhindern, sind in gewissen, durch die Erfahrung gonan bestimmten Abstanden Bleidrahte in dieselben eingeschaltot. Lange beyor nun an irgend einer Stelle eine Erhitzung der Loitungen in Folge Durchganges zu grosser Elektricitätsmengen eintritt, sehmilzt der dieser Stelle zunächst befindliche Bloidraht, wodurch der Strem selbstthätig unterbreehen wird. Durch Versuche kann man sich leicht von der zuverlässigen Wirkung dieser Bleieinschaltungen überzeugen. Wenn Dr. Schilling in seinem Journale für Gasbeleuchtung Brände anführt, welche durch elektrische Beleuchtung herbeigeführt, sein sollen, eo handelt es sich dort entweder um Anlagen, welche vor dem Bekanntworden der Sicherheitsbleieinschaltungen gemacht worden sind, oder um selche, die von Unternehmorn ausgeführt wurden, welche, in mangelhafter Nachalımınır des Systems Edison's, die von letzterem erfundenen Bleioinschaltungen nicht benntzten. Das von Dr. Schilling weiter gehogte Bedenken, dass bei ausbrechendem Feuer diese Beleuchtung segleich ganzlich versage, dürfte hinfällig sein, da die mit imprägnirter Baumwelle umsnonneuen Leitungsdrühte nicht mehr gefährdet sind, als die Rehrleitungen der Gasbelenchtung, sondorn im Gegentheil eine ziemlich bedeutende Erhitzung vertragen, so dass die Zerstörung der einzelnen Glühlampen nur in dem Masse allmählich erfelgen könnte, wie das Fouer um sich greift, während bei der Gasbeleuchtung sofort der Haupthahn geschlessen werden muss.

Nebenbei möge auch erwähnt werden, dass eine Gefahr für das Leben der Menscheu bei Anwendung der Gidblichtbeleuch-

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tung gänzlich ansgeschlossen ist, da elektrische Ströme von seleher geringen Spannung in Anwendung kommen, dass man selbst Leitungen, welche hunderte von Pfordekrüften übertragen, berühren kann, ohne einen merklichen Schlag zu erhalten.

Ueber die Frage der Feuersicherheit der elektrischen Beleuchtung hat sich Dr. Werner Siomens im "Centralblatt für Textil-Industrie" ausführlich gestussert. Bei der Wichtigkeit dieses Gutsebtens theilen wir die interessantesten Punkte desselben mit. Es heisst in demselben u. A.: Dio Gasbeleuchtung bloibt auch hei sergfültigster Anlage stets in hohem Grade fenergefährlich ganz aligesehen von der directen Lehonsgefahr, - denn jedor offengelassene oder undicht gewordene Gashalm kann eine lebens- und feuergeführliche Explosien hervorbringen. Dasselbe gilt von undicht gewordenen Rohrleitungen. Dagegen ist eine solide und sachgemäss angelegte elektrische Beleuchtung fast gäuzlich ungefährlich. . . . In Ränmen, in welchen viele brennbaro Füden oder sonstige Stoffe umherfliegen, oder in welche brennbare Dämpfe eindringen können, wird ein Sachverständiger keine offenen Flammen - seien es Gas-, Petroleum- oder elektrische Flammen anbringen. Für solche Rüume eignen sich besser die Glühlichter. Bei diesen ist die Fenersgefahr bei richtiger Anlage wirklich beinahe verschwindend klein, da der lenehtende Körper hermetisch in einer Glaskugel eingeschlessen ist. In Räumen, in welchen brennbare Stoffe mit den Wänden der Glaskugel in Berührung kommen können, kann man ausserdom Doppelglecken anwenden, um eine Entzündung an den heissen Wänden der Glaskugeln zu verhindern. Bei einer nicht mit Sachkenntniss und grösster Selidität ausgeführten Glühlichtanlage kann allerdings eine Gefahr dadurch eintreten, dass die Leitungen nicht richtig berechnet sind und sich erhitzen, oder dass sie nicht sieher eingebettet und befestigt oder schlecht isclirt sind. Endlich auch dadurch, dass nicht genügende Sieherheitsvorrichtungen angebracht sind, die verhindern, dass der elektrische Strem stärker werden kann, wie es die Drühte vertragen. In allen diesen Fällon kann es vorkommen, dass Drähte sich in gofährlicher Weise erhitzen oder durch zufällige Berührung zweier Drähte an der Berührungsstelle elektrische Flammen sich bilden, welche zünden können. Das Alles darf bei einer gut und mit Sachverständniss gemachten Anlage aber gar nicht verkommen, se wenig wie es verkommen darf, dass Gasleitungen undicht oder dem Zerhrechen etc. ausgesetzt sind. So richtig es demnach ist, dass schlecht angelegte elektrische Beleuchtungseinrichtungen feuergefährlich sein können, so unrichtig ist es, das System der elektrischen Beleuchtung überhaupt für feuergefährlich oder gar für feuergeführlicher als die Gasbeleuchtung zu erklären!..."

Das Publikums wird hiermach also die Ausführung von Beundtungsunlagen, gesnad wie die andere technischer Anlagen, nur solehen Unternehmern auvertrauen dürfen, deren Kenntniss und Erkhärungsie eine volle Gewält: für gate und sollide Ausschlichtung bisten. Leider Blats sich nicht verkennen, dass bei der schnellen Entwickelung dies olchtrischen Beleuchtungswesen sich diesen neuen Industriesweige Mandes stwandent, denen die erfordsriche Sachkomatniss fehlte. Die leicht erklärtlichen Misserfügle derutziger Unternehmer tragen dam leicht dam bei, eine an sich gute und lobensfähige Sache in den Augen des Publikums berunterzussten.

Die Frage der Brauehbarkeit und Zweckmässigkeit des elektrischen Githlichtes wird hisher vielfäch im Zusammenhunge mit der Frage der Thesterbeineltung verhandelt. Und dies ist auch sehr natürlich; denn die ontsetzlichen Unglitchsfühle der letzten Jahre laben die Techniker gewumgen, nicht nur Venindikamassregulu gegen die bestehendes Bolouchtungauten mergriffen, ondern neite darum denden, die bilenfrigm, sehr gefaltivelles Belenchtungsmittel durch ness en verschen Einen sehr verschender zu erstehen. Einen sehr verschende gestehender zu erstehen Einen sehr verschende gestehender zu erstehen. Einen sehr verschende sehr werden sehr verschende sehr der Sigh. Absdemis des Betattenstages liefert ein Gutantissen gier Katsdarfige im Theater von Ninna im Auftrage des Ministers der offentlichen Arbeiten abs im Auftrage des Ministers der offentlichen Arbeiten abseite ausschlieseitelt und die Anordnungen und Einrichtungen besteht werden der Bereckspelite im Theatern dieme, weelber sicht, welche im buntechnischer bew. haupfließlicher Hinsicht zur Vorminderung der Benezgeithe im Theatern dieme, welche wir hier nicht anber eingeben, dagegen einen Amang aus dem zweiten Theile birringen, welcher speciell auf die Belenchtung Beneg int. Es beiest dasselbeit

al) Die Fenergeführlichkeit der Theater beruht verzugsweise auf der Verwendung leicht entständlicher und nach der Entztändung ruseh aufflammender und das Fener sehnell weiter verbreitender Steffe zur Ausstattung des Bülmenraums, hei Auwendume.

2) einer Beleuchtung, welche starke Wärne verhreitet, brembare Gegenstände entzündet und heisse Verhrenungsgese entwickelt, die au den leicht entzündlichen Stoffen verüherstreifend, nach dem Schnürheden aufsteigen.

3) Velletändige Sicherhoit kann deshalb nur durch die Beseitigung der verhrembaren Gegenstände oder durch die Beseitigung der Erleuchtung mit "effenem Licht" und deren Eratz durch die Beleuchtung mit versehlessenem und zwar nöglichst "hidflicht verschlessenem Licht" erzielt werden.

4) Die Grösse der Feuersgefahr ninmt naturgemäss mit der Meuge der leicht entzündlichen Gegenstände und mit der Anzahl der Gasfiammen bezw. effenen Liehte zu und ab. Sie wilchst somit im Allgemeinen mit der Grösse der Rühne Ebense wächst bei ausgebroehenem Feuer die Geführdung der Zusehauer mit der Anzahl der letzteren, im Allgemeinen also mit der Grüsse des zefüllten Zuschauerraumes.

Es wird deshalb zur Verhütung von Unfällen die feuersiehere Anlage und Ausstattung der Theater um so dringender, je grüsser die letzteren sind."

In dem Guiachten wird zunichst der Ersetz aller Conratureinstudien ass Heis durch eiche am Eisem und wo dieses nicht aufläsig ist, die Imprignirung aller flehrer und Gewebe gefordert, vor allen Diugen aler die Beseitigung des offenen Lichts empfalien, da leitetres nach den stutistischen Angehen von Fölseh (z. eben) bei den während der Venstellung gewasen ist. Nach derselben Queile gehören nuch alle Theater, welche kurz vor Eininss der Erbüleums durch unversichtiges Entzinden der Gas- eder Gelfammen in Brand geriebten, zu der reich vertretenen Kategorie depingine Blahennaligen, welche durch schleicht belütztes effenses Licht zu Grunde ritueren.

Es heisst dann in dem Gutachten weiter:

"Ble kum dies nield thermschen, da auf der Beltan die grosen Mange beide austandlicher Gegenstände mit einer grosen Anzahl effener Planmen durchestet ist, um dem Berdarfinie einen belan Belenektung Gerüge zu thum. Diese Planmen untesen wenigstem zum Thol abweehenden dentzeinder und gelöseit und den beschiedigten intentierischen Effecten entsprechend au verschiedene Stellen der Beltan gebreit werden. Jede hächele oder vermiglichte Bewegung einer Ceulisse oder eines andemn feuerfängenden Gegenstandes, jeder Bruch eines Bewegungsmehentumms kam eine Berdhrung entstandlicher Gegenstände mit offsone Planmen, mittin die Gefahr einer Batundung herbeithren. Noch wesentlich er

höht wird diese Entzündungsgefahr durch die Anwendung des Leuchtgases. Erfolgt dabei auch das Anzünden der Flammen auf die verhältnissmässig sieherste und gefahrloseste Weise, auf elektrischem Wege, so kann die Zündung doch versagen. Dann strömt das Gas unverbrannt aus, und der nächste Zündungsversuch bewirkt eine Explosion, die auch entferntere Gegenständo direct in Brand stecken oder sio anderon offenen Liehten zusehleudern kann. Fast noch grösser ist die Gefahr. wenn die Entzündung nur an einzelneu Stellon vorsagt, ohne dass dieses Versagen sofort wahrgenommen wird. Dann bildet sich über einzelnen Ausströmungsöffnungen ein Gascomisch. welchee sich expledirend entzündet, sobald es die offenen Flammon erreicht, wodurch die Fenersgefahr direct auf weit entfernte Punkte übertmoon werden kann. In gleicher Weise können Beschädigungen der weit verzweigten Gasleitungen gefährlich wirken.

Diese Vorgänge geben Fölsch Anlass zu dem Amspruche, dass "des allgemein und in allen eivilisirten Ländern gülüge Verbot ven eifenen Planmen an fauengefährlichen Orten auffallend genug — für Theater ganz igenrit wird, obwehl, soweit bekannt, in keinen Staate diese Aussalmestellung der Theater durch ein Gesetz oder durch eine Vererdunug geentatet ist."

Die Beseitigung des offenen Lichtes aus den Theatern, so lange in letzteren leicht entstündliche und aufflammende Gegenstände in grösseren Mengen benntzt werden, muss deshalb ale ein unbedingtes Erforderniss der Feuersicherheit bezeichnet werden. Das Halfemittel hierzu bietet das elektrische Gibhlicht."

Nach einer kurzen Besprechung der Construction der Glüblampen und ihrer speciellen Vorzüge für Theaterbeleuchtungszwecko heisst es in dem Gutachten weiter: "Unter Berücksichtigung aller sehen bewührten günstigen Eigensehnfren dieser Beleuchtungsmeholo muss man sich jeden hubedingt dahin entscheiden, dass dieselbe als geeignet und berufen erseheint, die Fenersgefahr der Schembühne auf ein Minimum zu reducten, ohn jede Besintzichtigung des Zweckes der letzteren.

Obsohon die Beleuchtung des Zuschausrraumes der Theater wit weniger Gehinen mit sich führt, wir die des Bühne, erschiente es deelt ratheam, such für diesen und abschaupt für das genze Haus zur olektrischen Beleuchtung überzugeben. Anser der grösseren Sicherheit gegen Zeuerschaden bietet die olektrische Beleuchtung des Zuschauserzumes noch den grossen Vortheil, dass die Warmeneurbichelung verhaltismssigs bei über sehr gering ist, und dass vor allen Dingen die Jauft durch die Beleuchtung nicht verstorben wird. Des Ventilationsproblem letst eich bei allgemeiner elektrischer Belauchtung daher leichter Doen als bei Gabelenchtung."

Ze unwer grossen Genugthung sehen wir, dass um anch die Fenervenichtungs-Geselbelachen anfungen, sich von der grossen Fenersicherbeit der elektrischen Gibtlichtebenchtung ma überzengen um daher hoffentlich beid allgemein die Pitmien bei Anlagen mit Gibtlichtebenchtung hornbosten weren. Die Magdeburger Fenerversicherungs-Gesellschaft inssert sich in einem fihrer Hampt-Agestur-Girvulare über dies prinzipen Standerungen und Kongelanderunssen:

"Von allen objectiven Gefahremomenten, denen das Feuerversicherungsgeschäft, besonders bei Deckung industrieller Anlagen, unterworfen ist, immar zweifellos die Beleuchtungsgefahr den hervormgendsten Platz ein; ihr begegnen wir überall in mehr oder weniger drobender Gestalt, je nach dem Character der versicherten Risiken. Es iet deskalt in ersten Linie von joher uusere Aufgube geween, diese überull vorhandene Geführ mit aller Aufmerbannbeit zu vertreigen und ihr, so viel als möglich von ihrem Beginn an, entgegenstnieten, also von der Aufbewahrung der zur Füllung der Lampen erforderlichen Materialien, von dem Patten und Füllen der Lampen mit Edabel oder Petrobeum, von der Harstellung des Geses, sofern diese auf dem betreffenden Etsico sehlst stattfindet, und von der Gasleitung bie zu den verschiedensten Arten der Gaslampen.

Ganz besonders hatten wir aber auf die Beleuchtung der feuergeführlichen Betriebe und unter diesen wiederum derjenigen zu achten, bei denen es sich um Ausströmung leicht entzundlicher explosibler Gase oder Mischungen fester Körper in feinem Zustande mit der Luft handelte, und gerade bei diesen Betrieben ist bisher unser Bestreben, die Gefahr genügend einzudämmen, nur in sehr unvellkommenem Masse mit Erfolg gekrönt worden, denn wir dürfen uns nicht verhehlen, dass das Auskunftsmittel der Aussenbeleuchtung und der Verwendung von Sicherheitslampen nach Davy'schem Systeme im Innern der betreffenden Räume doch nur in solchen Füllen ausgiebigen zuverlässigen Schutz gewährt, in denen die vorgeschriebene Beleuchtung für den Betrieb ausreicht. We dies nicht der Fall ist, wo vielmehr ein grösseres Lichtbedürfniss, wenn auch nur zeitweilig, befriedigt werden muss, begegnen wir immer und immer wieder der verbotenen Beleuchtung mit genügend leuchtenden, aber ungenügend geschützten Lampen, Laternen oder Kerzen. Vor allen Gefahrsmementen der Beleuchtung tritt aber in den Vordergrund die Anzundegefahr der Lampen etc., sie mögen beschaffen sein, wie sie wollen. Wir dürfen nicht die Augen vor der Thatsache verschliessen, dass alle unsere Verbote des Gebrauches von Streichhölzern oder offenen Lampen zum Anzünden der Beleuchtungsflammen, alle unsers Gebote und Empfehlungen, diese oder jene Methode dafter innezuhaten, nicht immer und übernall durchgeführt werden, selbst da nicht, wo wir seitens der Versicherten uns des besten Willens verseihen dürfen, dieser Gefahr auf das Ernsteise entgegenzuntröten.

Vor Allem springt bei der elektrischen Beleuchtung der Wegfall der so verderblichen Anzündegefahr der einzelnen Flammen hervor, und dieser Punkt allein schon muss vom Standpunkte der Feuerversicherung als im hohen Grade massgebend für ihre Stellung zur Frage der elektrischen Beleuchtung erachtet werden. Ferner bietet die elektrische Beleuchtung in ihrer Leitung, sofern sie genügend isolirt ist, jedenfalls grössere Sicherheit, als jede andere Beleuchtungsart, bei welcher entweder flüssiger oder gasformiger Brennstoff in mehr oder weniger gefährlichem Grade vorhanden und bereit ist, einen Brand herverzurufen, oder doch zu verstärken. Auch ist die elektrische Lampe jedenfalls nicht gefährlicher, als andere Lampen, die schon durch ihre grosse Hitzeausstrahlung recht bedenklich sind, und bei Einrichtung von elektrischer Glühlichtbeleuchtung endlich darf von der Lampe selbst behauptet werden, dass sie Feuersicherheit in so vollkommenem Grade gewährt, selbst in den feuergefährlichsten Räumen, dass sich mit ihr keine andere Beleuchtungsart auch nur entfernt messen kann."

Es gowikhrt uns eine grosse Befriedigung, mithtellen zu können, dass beroits siens achtbure Zahl von Theaterdirektionen sich diesen und ähnlichen Ausführungen berufener Fachleute nicht verschlossen hat, sondern die Belcuchtung der betreffen den Theater mit Githlicht ins Werfs estets. Desgleichen sind bereits viele Fabriken, Spinnereien, Webereien, Branereien u. s. w. mit Glüblicht nach dem System Edison versehen. Trotzdem bleibt noch viel zu thun übrig, bevor die Arbeiten Edison's auf dem Gebiete des elektrischen Belenchtungswesens zum segensreichen Gemeingnt werden, aber es ist zu erwarten, dass je mehr die Lehren und Anforderungen der Hygiene - der Pflege des Menschen in gesamden Tugen - verstanden und populär werden, und die Fenersgefahr der üblichen Belenchtangsmittel erkannt wird, auch jene künstliche Belenchtung die ihr zukommende Verbreitung findet, die allen hygienischen Ansprüchen Rechnung tragende met gänzlich fenersiehere Giühlichtbeleuchtung mach dem System Edison.

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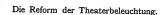


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INHALT.

Die Referm der Theaterbeleuchtung .			٠.							n
Durch Edison-Glüblicht beleuchtete The	ate	æ:					•	•	•	
Das Stadtheater in Brann										15
Theater in Hayanna auf Kuba .										87
Das Bijou-Theater in Besten										41
Das Théâtre du Parc in Britsuel .										40
Kgl. Residenz-Theater in München				i	Ċ	Ċ	i	i	Ĺ	48



Als das Louchtgas die chrwitrdigen Gol-Lampen am den Theaters verdreitiget, glubbe man mit den moion Lichte eine assercefontliche Vertesserung eingeführt zu haben. In der Taub tet das Ges eine Reibe ver wesmtlichen Vortstellen in seiner begennen Handlubung mud in der leichter zu erziebenden grüsseren Lichtenager. Des milhaume Instantlichten der Lampen kam in Wegfüll, man konnte sewohl den Zuechauerraam wie die Böhne milnieders verdunkten am der hellen, das Anziehen der Hammen erfolgte rascher, die Beinlichkeit war eine grüssere. Der Zuechauerram erschien glützenseder und prunkhafter und die seenischen Vergützge orhielten eine intensivere Beleuchtung, als die milnicht hamme der Od-Lumpen ihmen zu geben vernochte

Dess mus aber gleichzeitig mit diesen Vertheilen eine Anzahl von Nachtheilen eingeführt wurde, übersch mas iher Freude über die insen Errungenschaft, mul die eine Riecklehr zu der alten Belenehtung nieht meglein war, fügten sieh die Schanspiele, den Usebstämlen, die das Gaslicht im Gefolge hatte, und errungen die Unannehmitelhteiten mit Resignation, welche aus dem Gedanken hervorging, dass eine Abstallung der Uebel nun einmal zu den fremmen

Zu diesen Uebelständen zühlt in erster Linio die Ueberhizung der Theater durch die Gasflammen. Nur einige der wenigen neu ungelegten Theater simd mit Ventrilationsvorrichtungen versehen, die eine Herabminderung der Temperatur durch Zuführ abgekulitler Luté romgdielnen, die übrigen, nach alam Silie singerichteten, siud goblieben, was sie waren:
Rame, in denen die Tomperatur von Stunde an Stunde
bis anz Unerträglichkeit steigt. Gegen des Ende einer
Oper, eines Schaupieles gleichen die Theater, iamentlich bei
mitder Witterung, fach den gebeiten Raumen einer formischen
Bades, und in der warmen-Jahrezeit, wenn die Reisen beginnen,
Bades, und in der warmen-Jahrezeit, wenn die Reisen beginnen,
den Bennch des Theaters verzichten, gebietet die Nathwendigsteit den Schlass der Kunstinstitute, wedelen naturgemass eine
grosse Anzichungskruft auf des reisende Publikum ausabben und
zur Frenden-Proquen wessettlich beitragen mössten.

Gesitiges und körperliches Unbehagen besintschabigen nicht nur den Genus, sendern sich im Stande ihn anfrahaben, sebald ist oberhauft nehmen. Er ist ferner eine deren Veilfache Erfalturag bestätigte Thiessele, dass hohe Tenperaturen erschlaffend auf den Körper und den Geist wirken. In den stiellichen Gegenden zwingt die Hitze der Mittagezeit den Menscher zum Kinhalten der Arbeit und macht ibs Steats, welche dem Nerüllunder nicht als Bedürfniss erscheint, zur unmagstaglichen Neilverdigfeni, besone vie des Europier in den Typen von der Spannkraft einbüsst, welche ihm in den geministigten Erwiten eigen ist.

In den Theatern, doven Temperatur die Gasfelenchtungther die normale, dem Organismes geoigendes, erholds, in dem Kennsersklon, welche an demselben Usebatande leiden, wirdt von dem Zuschaner und Höner Anfinorkennskelt, vermehrte Receptionsthätigkeit und eine Empfänglichliche für des Gebotzene verlangt, die eine gestiegeter Ehnkigkeit der Sime und des Geistes erfordert, eine Arbeit, elne welche der Genuss eines Kunstwecken zieht deskhet zie. Unter dem ermatienden Effifiases der Hitze, der durch die Verbremunugsprechtliche des Gasfinisse vermerünigten Lint erseichlichen Körper und Geist um so mehr, je länger der Aufenthalt in der Hitze und der verdorbenen Luft dauert, je mohr die Verderbniss und die Steigeraug der Tomperatur zunehmen.

Die bedeutende Steigerung der Temperatur und die Zamahne der Laftwordebnies in meuschenerfülten gesetleseiteten geseilbesemen Reinnen, zumal in Theatern, ist von Prof. M. von Pettenkofer zufheumtesig medigewiesen; ') sie macht sich jedech auch dem demerkeiten Beuchetung dentileh in der Abspannung bemerkter, die dem Zuschnarer den Gemus verkammert, des reileselle übervinden imme, um empfanglich gesunsenfligt zut bleiben und nicht zu ernatien. Die Hinfung ersunsenfligt zut bleiben und nicht zu ernatien. Die Hinfung ersunsenfligt zut der Metzen gesenter, die Anwendung seenischer Beiernittel in den letzten Akton, welche der Neuenist, den früheren Epochen gegenüber, mur Verwarfe gemecht werden, haben nicht zum geringen Theil livren Grund drich, dasse geiß, ein durch hohe Tempentur erschäufen und ermädetes Publikun durch kräftigere Mittel anzuregen, als genau genannen mit eller Kunst vereibne sind.

Mit dem Gaslichte sind die Bedingungen, nuter denen die dernissiehen Schöpfingen zur Darstellung gelangen, andere, als zu dem Zeiten geworden, von denen viel des Rähmlichen berichtet wird. Ob zu ihrem Vortheile, wollen wir hier nicht entscheiden, sondern überhassen den Kaustästhetikern die eingebeade Unterschung dieser Frace.

Dem Publikum gegenüber steht der darstellende Künstler, der mit dem Aufgebete physischer und geistiger Kraft die Werke der Diehter und Komponisten zu verkörpern sneich Anch auf ihn wirkt die Steigerung der Teunperatur, und zwar um se eindringlicher, als der Schutspieler oder Sanger, direkt ven den

*) Vergl. Veröffentlichung der Deutschen Edison Gesellschaft I. "Das Edison-Glublicht und seine Bedeutung für Hygiene und Rettungswesen. S. 11. Wärmestrablen der Gaslampen geterfür wird, welche zu alleis Seiten, härter den Koulleven, oben härter den Schlieten und zu seinen Zuseen an der Rampe augsbracht sind. In der von diesen Lampen umanförlich und er erzeutgelte Hitze ist där Knuster gezwungen zu spielen, met precien, tilt Krith muss-gezen, welste die Relle erfreche grewen genen, welste die Relle erfreche grewen genen, welste die Relle erfreche grewen Relle der erfreiert, haus ermessen, was er heiset, dieselber in der Tumperstatur zu Eule zu führen, welche den Schländer zur Siesta zwingen werte.

Deza kommt, dass die den (tselauspen der Rampe enbstromenden warmen Verbremunuggssee von dem Darsteller diegoaltmets werden, dass die treckene erwirmte Laft das Sprechen und Singen erseltwert, da sie ansdörrend auf die Schleinhabste des Münde und der Kehle einwirkt. Es ist daher sicht zu verwindern, wenn dem in Schweise gebadeten Klusteler bisweilen die Krifte erhänen, das Organ nicht in erwinschler Fülle naspricht und der Darsteller in einer sehwierigen, an und für seils schon grosse Antsteungung erforderenden Relle zum Schlass derselben, vie der landlänfige Ausdruck lautet, "nieht auf gleicher Holte beileit".

Alan ziebe die Unstände in Betrucht, wolche dem Kinister die Ausbung einer Kinist erschweren, und mas wirdt begreiffich finden, dass es ein knun zu erfüllendes Verlangen ist, dam Darsteller zummuthen, in einer Temperatur Körperlich nach gesätig nicht zu ermäten, id einer Temperatur Körperlich nach gesätig nicht zu ermäten, id denderwag hebter ist, da diejonige, welche sehen den ruhig dassitzenden Zuschauer in seiner Empfänglichette bestirtstichtigt und in das Gefühlt des Unbehangsun, der Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und Stender Missestimmung und zuletzt in Körperliche und geistige Erschaftung und zu der Ausstelle und gestige zu den der Ausstelle und gestige erschaftung und zu der Ausstelle und gestige Erschaftung und zu der Ausstelle und gestige zu der Auss

Durch geeignete Ventilatiensverrichtungen hat man, wie bereits erwähnt wurde, die üble Einwirkung der Gasbeleuchtung in einigen Theatern unseihildlich zu machen gesucht mul anch ehfriedigende Besentlate erhalten, denen judoch bedeutende Anlage- und Beitriebekesten gegenather gestellt werden mitseen, die einer allgemeinen Verbreitung der mittelst Maschinen bewerkstelligten Ventilation, wedebe nach der bisherigen Erfahrung die einzige zweekerfüllende ist, hindernd entgegenstehen.

Wird auch der Zusehauerraum durch Ventilationsapparate von der heissen, mit Verbrennungsprochakten verumeningten Lanft befreit, so beibit dech die von den Rampen-Plammen aufsteigende erwärmte Luft, welche nicht nur dem Schauspieler belästigend entgegenetent, eendern auch in akustischer Bezichung Nachkielo mit eich bringt.

Nach den Untersuchungen von W. W. Jaques*) bildet eine aufeteigende, erwärmte Luftströmung eine Wand, welche den Schall zum Theil durchlässt, zum Theil aber reflektirt, se dass der durchgehende Schall um se viel von seiner Intensität einbüsst, als ven der Luftwand zurückgewerfen wird. Es gelang Jaques segar in ceinem Verlesungssaale, durch mohrere Schichten aufwärtsströmender erwärmter Luft, se viele "Luftwände" herzustellen, dass die Roflexien derselben im Stande war, den Teu der menschlichen Stimme bis fast zur Unhörbarkeit abzudämpfen. Bei selbst langsamem Sprechen ward die Stimme nicht nur sehwächer, sondern auch verworren und undeutlich, als wenn jede Silbe mehrere Male in kurzer Anfeinanderfelge wiederhelt würde. Eine Flöte hatte dieselbe Wirkung, wie die menschliehe Stimme, während eine Vieline geringere und eine Tremmel gar keine Wirkung zeigte. Am deutlichsten traten die Erscheinungen der Tenabnahme und der Undeutliehkeit bei der menschlichen Stimme und den-

^{*)} Philesephical Magazine. Ser. 5. Vol. VII. pag. 111.

jenigen musikalischen Instrumenten zu Tage, welche verhältnissmüssig geringe Obertone besitzen.

Je mehr solcher Luftströmungen vorhanden und je mächtiger dieselben sind, um so grössor wird die Undoutlichkeit sowohl des gesprochenen Wortes, als die einer gesungenen Note. Der ursprüngliche Schallstrahl, der auf den ersten Luftstrom trifft, wird theils reflektirt, theils durchgelassen. Der durchgelassene Schallstrahl wird wiederum von dem nächsten Luftstrom getheilt und so fort, bis alle Luftströmungen passirt sind. Da jedoch der reflektirte Schall auch wieder bei seinem Rückwege eine Luftwand trifft, die ihn theilt und reflektirt, so entstehen viele sekundäre Wellen, die das Ohr schliesslich treffen und die Deutlichkeit des ursprünglichen Tones verdecken. Luftströmungen von wechselnder Dichte veranlassen somit zuerst eine Abnahme der Tonstärke und dann eine Undeutlichkeit oder Verworrenheit desselben.

Hieraus erfolgt klar, dass man, um eine gute ungehinderte Fortpflanzung des Schalles zu ermöglichen, die Luftströmungen beseitigen muss.

Dass die Zerstörung derartiger Luftströmungen nun in Wirklichkeit die Akustik eines Raumes ausserordentlich begünstigt, hat Jaques durch seine Beobachtungen in der Musikhalle zu Baltimore bestätigt gefunden.

Die Ventilation jener Lokalität wird in der Weisc ausgoführt, dass die frische, im Winter hinter der Bühne erwärmte Luft, horizontal über die Bühne streicht, über die Rampe und das Orchester geht, und dann diagonal in mässiger Bewegung nach dem Dache zieht, so dass die Bildung kleinerer aufsteigender Luftströmungen gehindert ist.

Die Akustik dieses Raumes wird als ausgezeichnet gerühmt; es ist den Sängern ungemein leicht auf der Bühne zu

singen und zu sprechen nnd selbst geringe Geräusche, wie z. B. tiefes Athmen und leises Flüstern auf der Bühne, worden im ganzen Saale gohört.

Diese vortreffliche Akustik rührt aber nur von der Besohaffenheit der Luft und nicht etwa von der Anordnung und dem Material der Wände oder auderen Ursachen her. Um dies zu beweisen, wurden während einer Vorstellung Personen an verschiedenen Plätzen des Zuschauerraumes ohne weitere Information aufgestellt, welche nur genau zu notiren hatten, wenn sie deutlich und wenn sie schlecht hörten.

In verschiedenen Intervallen wurde dann während des-Abends die Ventilation unterbrochen, so dass die heissen Luftströme von der Rampe, dem Orchester und anderen Lichtquellen ungehindert aufsteigen konnten. Fast ausnahmslos lautete das Zeugniss der Hörer, dass zu Zeiten der Ton verschwommen und undentlich gewesen sei und man bemerken konnte, dass das Publikum im ganzen Hause sich anstrengte, um zu hören. Die nach der Uhr gemachten Aufzeichnungen ergaben, dass diese Zeiten genau mit den Unterbrechungen der Ventilation zusammenfielen. Es ist ferner eine in der Theaterpraxis bekannte Erscheinung, dass ein Sänger oder ein Schauspieler auf der Probe, vor leerem Hause mit seinem Organ viel mächtiger wirkte, als am Abend während der Vorstellung bei besetztem Hause. Man pflegt diesen Unterschied den schallabsorbirenden Kleidungsstücken des Publikums zuzuschreiben, die keineswegs ohne Einfluss auf die Akustik sind, aber da auf den Proben die Rampenbeleuchtung fortfüllt - bei den Schauspiel- und Klavierproben auch noch die Orchesterbeleuchtung. so darf man, gestützt auf die Experimente des W. W. Jaques, die Einbusse, welche das Organ an Kraft, an Mächtigkeit und Glanz am Abend im Vergleich zur Probe orleidet, grösstentheils auf

Rechnung der heissen Luftströme stellen, wolche von der Rampenbelenchtung nud den Lampen des Orchesters aufsteigen.

Die hier kurz entrieten Machhiele der Gaubeleuchtung: die Überhritung der Zuschnerrumss und der Bahn, wache des Pablikum in Unbelagen versetet und den Dardeller an erneibigfenden Anstreungungen weigt, der gesemfelnischsähligunde ermödende Einflass der Verbreunungsgune, die Schwierigsunder Umpflecht und der Bernstatt der Verbreunungsgune, die Schwierigsunde in der mitden Jahresseit zu Schwierigsunder Verbreunungsgune, die Schwierigsund sie Schwierigsund weisen und Schuld darm sind, dass in den ersten Parqueterbien meistens am weisigsen unt gelebr wirt, sie alle dräugen im Interwee der Publikums, der Darsteller, ja der Kumst selbst, auf eine Reform der Theaterbele und hung.

Durch die geniale Erfindung von Thomas Alva Edison, durch das elektrische Glühlicht, ist diese Roform zu vorwirklichen.

Bei einer sändlichen Lichterzeugung von 100 Kerzen ontwickelt ein Leuchtgas-Argandbrenner 48:10 Warmeeinheiten, die elekein Leuchtgas-Zweilenhrenner 12:150 Warmeeinheiten, die elektrische Glählicht dagegen um 290—586 Warmeeinheiten.*) Diese Zahlen bedürfen weiter keines Commentaren.

Das elektrische Güthlicht, meh dem System Edison, entvielde bei gleicher Lichstätze verhältnissmissig geringe
Wännemengen mis frie vin gelichen Verhenungspreichtlen,
ebaus wie es der Luft keinen Sanorsteff entzieht. Durch diese
seine nicht hoch gemag anzuschlagender Eigensechaften ist es
frei von den Nachtheilen der Gasbelenchtung und hat nicht
die Uebelstände im Gefelge, von denen im Vorangehenden
gegerrechen wurde.

*) Vergl. Veröffentlichung der Doutschen Edison Gesellschaft I. "Das Edisen-Glühlicht und seine Bedeutung für Hygiene und Rettungswesen." S. 9. Das Gibhlioht sehmaltet micht dem Gemus des Theatrbeauchers, da es den Aufenthalt in den elektrisch belenchteten Raumen zu einem angesehmen macht. Es erleichtert dem Darsteller die Ausführung seiner Aufgebe. Die Schauppieler depreigen Theatre, veelebe bij eitzt das Gibhlicht eingeführt haben, sind giücklich darüber, von der Zughitze der Rampenbelneitkung erleit zu sein.

Das Glühlicht giebt den Theatern die Annehmlichkeiten wieder, welche das Gaslicht ihnen genommen hat.

Das elektrische Glühlicht orhöht die festliche Stimmung durch seinen reiuen, sonnigen Glauz, den es ausstrahlt, ehne die Luft zu orhitzen und zu verderben.

Be erienchtet die Bilme mit wohltbunsder Kinrheit, deren Dekontdomen es nicht wie das Gesileit durch Raussbatz verdürbt. Es ist dem Auge wegen seiner Rahe sagenehmer, sit das zuebensig falleschrende Gesileit, und meht deshalb nervöse Personen nicht noch nervöser, wie jenes. Es überhitzt die Räusen sicht und sehrecht des Publikum bein Entritt der milden Jahresseit nicht vom Theaterbessebe ab, wie das Gasicht. Das Publikum, welches einmal die Wehlitzt der Beleuchtung von Theatern mittelst Glühlicht empfunden hat, wird dieselbe nicht nehe reüberwer wollen; diejeigen Theater, Konzerstale und geselligen Zusammenkturfen dienenden Eistements, welche das Glühlicht einführten, habet ihrer Konkurrens einen gewaltigen Vorsprung abgewonnen, indem sie die Bedürfnisse der Zeit erkannten.

Die von Tag zu Tag zunehmende Verbreitung des elektrischen Glüllichts wird zur Folge haben, dass das Fublikum sich mit den Annehmlichkeiten und Vortheilen desselben mehr und mehr vertraut mecht. Es kann daher nicht ausbleiben, dass das Publikum das Verlangen stellt, an dem Fortschritt zu participiren, den das Glühlicht auf dem Gebiete des Beleuchtungswesens repräsentirt.

Man wird mach nicht gar langer Zeit die Prage aufwerfen, wie es meiglich war, in nicht oldstriche bleendreiten Heatern auszuhalten um an den Kunstleistungen ungetrüben Genus auszuhalten um an den Kunstleistungen ungetrüben Genus am finden? Es wirt sich hermustellen, dass durch die Belencittung der Thanter mit elektrischem Gilhileit. Alle gewinnen: das Publikum, die Kunsteler, die Drecktionen und – die Kunst, welche ein empfunglicheres Publikum und schaffensfrendigere Danstelle findet.

Die praktischen und technischen Erfahrungen, welche bis jetzt bei den Glühlichtsunkgen verschiedener Theater gemacht werden sind, werden uns mit den felgenden Seiten beschäftigen; sie geben dem Fachmann nicht nur, sondern auch jedem sich Interessivenden Auskuuft über die Installirung des Glühlichtes in Theatern.

Die elektrische Beleuchtung des Stadttheaters in Brünn.*)

Brun ist mit seinen 90.000 Elluvolneru und seinen zahlreichien Turbe und Leerkehrikun ein der bedentendenten Patrikstädie Oesterreichs; wir durfun mus daher nicht wundern, in einer so reichen Stadt ein Theater von selcher Gresse und Schönbeit zu finden, dass es einer Haupstadt wirtlig wärn. Das Theater ist von allen vire Seiten frei und stadt inmitten schöner Parkanlagen, welche auf dem Terrain der im Jahre 1800 niedergelegnen Festungswerte angelegt sind; es ist an die Stelle eines im Jahre 1871 errichteten Interinsthauter setzeten und nach en Plussen der Wiener Architekten Fell her und Helmer ausgeführt werden. (Drift Fig. 1) Der Rau halts stehen im Aussersen des Theater in seinen Haupstamileikeiten, der Vorhalle mit Tepppenhaus, dem Zuschauerraum und dem überhöhrei Balmearunne, erkemen.

Der Zuschanernam besteht aus dem Parquet, der Rängen und dem Amphichaten, ist directiver, für Sitzipätes eingerichtet und kann 1800 Personen fassen. Ursprünglich wur denselbe für 1600 Personen berechnet; infolge des Brandes des Winster 1801 Personen betrechnet; infolge des Brandes des Winster in die die der die Sitzpätze verringert werden. Ans demselben der die Sitzpätze verringert werden. Ans demselben Grunde wurden auch an Stella von zwei Seischretzepen des ersten Entwurfes deren vier angebracht. Der gauze Zuschanstrumt ist in bellen Parbenflosen gelauften und rieben int Vernaum ist in bellen Parbenflosen gelauften und rieben int Ver-

^{*)} Auszag aus dem im Mürzbeft 1888 der Zeitschrift des Vereius deutselten Ingenieure enthaltenen Artikel: "Die elektrische Beleuchtung des Savey-Thenters in Leuden und des Stadtiteaters in Brunz.

goldung versehen; die innere Aussohmückung der Logen, ferner die Draperien sowie die gesammten Sitzplätze sind im kräftigen Dunkelroth gehalten.

Das Bülmenhams ist von dem fürigen Gobände durch litä jar, milebe Wände und von dem Zanshansrram durch einen einsernen Vorhamg gestremt. Dasselbe besteht aus der Hunphälnise, dem Schantrholen, der Untschaltun, der durch einen einsrem Vorhamg von der Hamphälnise gestremten Hitzerbalten und der zu beiden Seiten der letzteren gelegenen Decorntossamsgazinen. Der Schantrholen und die Unterbühne haben ungeführ die Höhe der Hamphälnise.

Eine Einrichtung für Gasbelenchtung ist in den gauzen Hanse nicht vorhanden. Glucklicherwise entschloss sich der Betuner Gemeinberath auf Betreiben die Beltgermeister Winterholler noch rechtzeitig, nicht Gassoudern die elektrische Belenchtung einzuführen. Man muss diesen kühnen Estabhlass um so mehr bewundern, ab damab diesen kühnen Estabhlass um so mehr bewundern, ab damab noch nicht vorlagen. Nin, meine Herren, wer die Anlag gesehen und sich von ihrer Vortrefflichkeit dieterzagt latt, wird erkannt haben, dass der Brünner Gemeinberath seinen Entschluss nicht zu berenze latt, völmehr seinen thatfüligen Burgermeister dauben muss, dessen rastlosem Benühen das Gelüngen der gausen Sache su vereinlagen ist.

Die elektrische Beleuchtaugsaulage des Theaters wurde gemeinschaftlich ausgeführt von der Commandit-Gesellschaft für augewandle Bektrieitt Brackurer, Ross & Consorten in Wien und der Société électrique Edison in Paris, auf Grund eines Vertrages, dessen wesentlichste Punkte später mitgetheilt werden sollen.

Die Beschreibung der ganzen Anlage will ich in vier Abschnitte theilen.

1. Maschinen-Anlage.

Das Maschinenhaus ist ungefällr 300 m von dem Theatér entfernt. Ueher die Maschinen-Anlage (Tafel Fig. 2 und 3) entuelme ich einem Vortrage des Hrn. Burghardt, Baurath der Stadt Brünn, die folgenden Angahen:

Die mit allen erfonderlichen Heis- und Sicherheits-Armstren ausgestatzen Kassel worden durch eine Wanddampfpumpe mit Wasser der städtlischen Wasserleitung gespiest,
weltest dieselb aus einem kleinen druchfreine Behalter ensaugt und durch einen Druckrühren-Vorwirmer in die Kessel
beförstert. Letzterer wird von dem Abslumpf der Dampfmaschien durchsichent und bietet demesleben eine Heisfiliche
von lift, qm, welche genügt, um des Speisewasser bis 90° C.
vorzinwirmen. Zur grösseven Sicherstellung der Kesselpeitung
ist am gonunten Wasserbelätter eine Schaffar- und Bulenberg'sobe Studiumpune augeschossen, deren Druckleitung mit

der Speiseleitung in Verbindung steht. Die Dampfkessel sind auf sieben Atmosphiren Betriebsspannung concessionirt, welche Spannung auch als zulässiger Druck für die Dampfinasehine in Aussicht genommen ist.

Behufs Rauehverzehrung sind über den Rosten der Keesel eigen construitte Dampfgeblise angebracht, welche zur Zeit der frischen Beschickung der Roste in Thätigkeit gesetzt werden. Die den Keeseln gemeinsame Esse laat 30 m Höhe.

Die Dampfmaschine, eine 110 pferdige Hochdruckdampfmaschine (System Collmant), Zwilling mit Kurbehn unter 90°, ven 850 mm Durchnesses, 800 mm Eind der Kolhen und 160 Umdrehungen in der Minnte, zeichnet sieh durch ruhigen Gang aus; die Stenerung wirkt, selbst bei 105 Umdrehungen in der Minnte inssentlich hieher tallelles.

Auf der gemeinsamen Welle ist das Seilschwungrad von 4 m Durchmesser angeordnet, welches die Vorlegewelle mit sieben Hanfseilen von je 40 mm Durchmesser treibt.

Bei einer mittleren Spannang von 1,8 kg pro qem, welche einer G- bis 7 flachen Expansion entspricht, orgiebt sich eine indicirie Leistung von 65 Pferchkräften für jeden Oylinder; im Falle einer Reparatur der einen Maschinonlaßte kann die außere durch stärkere Füllung auf etwa ¼ his zu ¾ der gesamnten Leistung herungszegene werden.

Vermittelst der sieben Ennfaule wird die gesammte Knaft, der Dumpfinnesbenie von 1, in Durchmesser und die parallel einer Wand des Massehienben von 1, in Durchmesser und die parallel einer Wand des Massehinenhanses landfusie fürstungen webele deburgen, welche dennache 800 Undrahmagen in der Minnte macht. Von der Transmissionswelle ans wird die Bewegung mittelste baumwellener dernetatspreter ans wird die Bewegung mittelste baumwellener dernetatspreter Bienen, welche in Gabela laufen, auf die im Maschinenraume behöndlichen vier Zülssenweisen und zwie Grammodelsen

Dynanomaschinan übertragen. Von letzteren diant die grössere (dinfspfeuige) am Betriebe von fult vor dem Theate aufgestellten Begenlichtern, die Ideinzer (zweipfeuige) zur Erzeuge von Effektbelenchtungen (c. B. zur Monhammer von Mondschein durch elektriseltes Begenlicht) auf der Bühne. Es soll noch eine dritte Grammer sehe Masschins aufgestellt werden, welche den Storen für eine bereits auf dem Boden des Zuschungramms aufgestellte, zum Betriebe eines Eschausters dienende, seemdiene Dynanomaschen liefern soll.

Die vier Editon'sdalen Dynumennschinen (Modell K), welche im Sauden sind, je 200 A-Lampus von je 16 Nevranl-korzam Lichtstärke zu speisen, labon die folgenden Dimenscionen; der Wichtstand der Ankare beträgt (1928) Olm, der der Magnetes 13,40 Olm, die Stromatirke 183 Ampler, die Klemmenspammurg II D volt. Es sind die Ommitateschülsteilungen vorlanden. Jedo Maschine wiegt 4000 kg und bedarf zu ülrem Betriche 50 Pfersbericht?

Die vier Maschinen, welche 900 Umdrehungen in der Minnte machen, werden, da sie hödelstens gleichzeitig 900 Gilllichtlampen speisen, nicht auf das höchste Mass ihrer Leistung in Anspruch genommen. Eine Aushulfennaschine ist nicht vorhauden; sollte eine der Muschinen vorragen, so werden die übrigen in entsprechend höhoren Masse housprucht.

Die elektrische Anordung der Maschinen ist aus der schematischen Siciera (Trafa 182, 4 sz enrechen. Die vollausgesagenen Limien bedenten den Haupstarenkreis, die punitirten den Erregungseitsenkreis. Die vier Maschinen sind parallel geselanlet; ihre Elektromagnete werden darch vier ebenfalls parallel geselanlete Zweigströme erregt. Der in jeder Maschine zeraugste Strom durchlänft eine mit der Wand des Maschinehauses angebrachte Schaltverrichtung, unterhalb welcher sich die Drükte zu einem genotiannen Strange vereinigen. Eine gleiche Schaltvorrichtung ist für den Erregungsstromkreis vorhauden. Zur Regullrung der elektromkorfsichen Kraft der Maschine werden Widenstände aus Neusilberdraht uitktelst eines Kurbeleinschalters in den Erregungsstromkreis eingeschaltet.

2. Kabal.

Der in den vier Maschiuen erzeugte Strom wird in einem Stromkreise zu dem Theater geleitet. Es dienen hierzu die

Fig. 1 bekannten Ed ison-Kabel (Textfigur I), in welchen Hin- und Rückleitung gemeinsam in einem
Eisenvelr, welches in vorliegenden Palle einen
Durchmesser von 76 mm lat, eingeschlessen sind.
Die Leitungen besteben ans halbmendförmigen
Kupferbarren, welche von einander mid von der

Eisenolbre durch eine Isolitran ses von eigensartiger Zusemmenschung gedrumt sind. Diese Kabel können wie Gasleitungsröhren in die Erde versenkt werden und liegen in Bethan in tief. Die einzelnen zur Verwendung kommenden Röhren laben eine Läuge von dir; die ungefährt fem an jedem Ende herverragenden Kupferbarren werden mit denen des nichtsten Röhres durch Lörnigs Begle verbunden, mei eine Anseleinung und Zusammenrichung der gauzen Leitung zu gestatten. Siebe Textifigur 2.



Beim Legen der Kabel wird folgendermassen verfahren. Die bervorragenden Kupferenden werden sergüttig gereinigt und sedenan zwei Beinstetate so nentander gelegt, dass zwiechen den Kupferenden ungefährt ein Zwischenraum von bem bleibt. Die kupferend - befornigen Bigel worden darum fintlebst Schrauben an den Kupferenden befeußt. Um aber einen auf im Falle sieherne Contact zu vorsielen, werden die Kupferstlache im Wasserstellte mit einem gussienernen Kasten umgeben, dessen Immers, medelem man zwischen die beiten Zele ein mit Paraffin getrankte Kartenblatt gelegt hat, mit Iselfirmsse ausgegensen wirt.

3. Einrichtung im Theater.

Im Thester befinden sich rund (400 Edi sen 'sehe A-Lampen on 16 Nermalkern Lichteitste, webles simmlich parallel geschaltet sind (a Textigur 3). Das den Strem zuführende Kabel mitndet im Keller und wird hier gleich in wesi Stremkreise getheilt. In den einen dereselben, die segenannte Hausleitung, sind alle diejenigen Lampen eingeschaltet, welche während ihrer genanne Brenndager einer Ausderung der Lichtstärken nicht bedürfun, also die Lampen zur Erleuchtung der Varhalt, der Teypenatiune, Phru en w. v. jin Zeh beträgt 300.



In den zweiten von der Hauptkabelleitung abgezweigten Stromkreis sind die sämmtlichen Lampen eingesebaltet, welche

Zur Beleuchtung der Bühne bei den im Laufs des Tages abruhlindend Preben dienen 40 Editson'nobe B-Lampon on jo 8 Normalkorzen Lichtstaties, welche durch ohne im Koller aufgestellte, kleine Gramme'sche Maschine gespeist werden, zur deuen Betrieb ein such zur Bewegung eines Ventlichten besämmter sechspferdiger Otto'seher Gammeter dient. Als beonders bemerkenswerth seh ihre revulunt, dass die den Raum dieses Gammeters erlauchtende Planme die einzige im gamzen Thaster vorhandene Gastfamme ihr

Erdgeschoss	8
Parterre, verdere Leitung einschl. der Verhalle	118
" hintere Leitung	10
Mezzanin, vern	18
n hinten	80
I. Rang, vorn einschl. Foyerbelenchtung	79
" hinten	10
II. Rang	17
III. Rang, vorn einsehl. der Krenleuchter im	
Prachttreppenhaus	40
, hinten	34
Amphithester	- 5

Transport Bühnen- und Zuschauerraum: 6 Soffitten zu je 101 606 Rampe rechts 71 " links 71 Portaleoulisse links 30 reohts 30 4 Versetzstücke zu je 8 Zuschauerraum I. Rang II. Rang 20 III. Rang 21 Amphitheater Kronleuchter Unterbühne) nicht regulirbar Soufflour Probenbeleuchtung: 1 Soffitte Souffleur . Orohester

Die Theilung des durch des Kabel sugeführten Stromes geseinheit mitstelst einer Schaltverrichtung (s. Tab ligur 5), in welcher die mit einer Fahne vernehmen Pfelle den nicht vergulirberen, in der Zeichrung als geöffnet dargestellten Stromkreis (Hausdeitung), und die mit zwei Fahnen versehenen Pfeile den regulirbaren, als geschlossen dargestellten Stromkreis bedeuten. Die mit für bezeichneten Belstreiffen haben den Zweck, im Falle eines kurzen Schlusses in der Leitung eine Erkitzung dereiben zu vermelden. Entstelt hamilied durch irgend einen Zufall ein kurzer Schluns, d. h. eine ütnete Vorbindung der Rin- und Rücksleitung, so mass, das plütelhei ein grosser Wildestand enngeschaltet wird, in den beiden Drätken onis ekstric Erhitung statisch ein dieselbe plänzat sich bei der grossen Warnecheitungsfläßigkeit der Kupfers sehr sehnell fort und einsilte den in die Leitung eingeschalteten Bleistreifen durch, wodurch der Streum untertrebene wird, bever eine fenengeführliche Erhitung der Leitungen eintritt. De nattriche inne eine Beischerung nicht zu weit von einer geführleiten Stelle onifernt sein durft, so ist im Brünner Tinester die Anerdaung gertrefin, dass bei jeder Abzweigen giener Leitung immer eine selhei Bleisicherung eingeschaltet, mindestens aber je eine Gruppe von 6 ist 10 Lampen mit einer seichen versohen ist

Die Hausleitung steigt sankrecht vom Keller bis zum Amphithester empor. In jedem Range sind Abzweigungen angebracht, welche setze mit einer Bleisieherung & und mit einem Störseleinschalter A, wie in Fig. 6 dangestallt, versenben sind. Die Leitung verzweigt sich also astförmig durch das ganze Haus.

Die Leitung für den Bühnen- und Zuschauernaum geht unmittelbar vom Keller zum Regulirungsapparat, dem interseantesten und wichtigten Thella der Anlage. Bewer die Leitung deussiben erreicht, werden von derselben die 13 Lampen für die Unterhalne und die 2 Lampen für den Souffleur abgezweigt, da dieselben einer Regulirung nieht beidrung niere.

Zur Beschreibung des Regulirungsapparates übergehend, mei hnech hemerken, dass die Lampen einer jeden Soffities, Rampe und Ceutiese in drei Stromkreise eingeschaltet sind, und zwar ist jede zweits bezw. dritte Lampe mit einer elastischen Gelahindellt von rother bezw. grüner Farbe überzogen, um dadurch das zu verschliedenen Ellmenarvocken erforderliche farbige Licht hervorbringen zu können. Da alse von sämmtlichen Schitteen, Rampen- und Coulissealampen nur der drittet Thell zu gleicher Zeit brenat, so sind immer nur ungefähr 90 Lampen im Betriebs. Am Beden der Bähne und auf den Schuttbeden sind je soelb Pars Pelllemmen angebrucht, von welchen aus der Strom den Versetzstäcken durch biegsmen Leitungen zugeihrich wird.

Die in den Fig. 7 und 8 sehematisch dargestellte Einrichtung des Regulirungsapparates ist eine ziemlich verwickelte, da bei einem Theater, welches, wie das Brünner, allen Kunstgattungen dienen muss, in dem bald eine Pesse, bald eine Tragodie oder eine grosse Oper gegeben wird, eine möglichst vielseitige Regulirung der einzelnen Beleuchtungsabtheilungen möglich sein muss. Die Einrichtung besteht im wesentlichen darin, dass der Hauptstrom in so viel Stremkreise getheilt wird, als aus bühnenteehnischen Rücksichten erforderlich sind, nur dass in dieselben mittelst eines Kurbeleinschalters je nach der gewünschten Lichtstärke der Lampen Widerstände eingeschaltet worden. Der Regulirungsapparat ist rechts auf der Bühne an der Wand, welche dieselbe von dem Zuschauerraume trennt, ungefähr 2 m über dem Fussboden angebracht. Wie man ans der Fig. 10 leicht ersieht, ist im vorliegenden Falle für die Lampen jeder einzelnen Soffitte, der sämmtlichen Soffitten auf einmal, jeder Rampenhälfte, jeder Coulisse, der ganzen Bühne auf einmal, der Versetzständer auf der Bühne. der Versetzständer auf dem Schnürboden, endlich für die Lampen des Orchesters und die des Zuschauerraumes eine besondere Regulirungsvorriehtung vorhanden.

Um ein Bild von der Einrichtung des Regulirungsapparates im einzelnen zu bekommen, ist der Stromlauf für die erste Soffitte ausführlich dargestellt. Die Karbelsinschalter a und b (vergl. Tafel Figur 7 u. 8) sind auf einem Tische derset angebrecht, dass sie bleibt gebandabb werden können; su der Rückvand sind die einfachen Einschalter a und d und über denselben die Drahtwicherstande und / befatigt. Der vom Haupsterom abgeweites Strom diest entweder, wenn des Stromkreis durch den Einschalter e und / bestägen der Stromkreis durch den Einschalter einschlessen, despendenen, desgene der Stromkreis der veden oder der grünen Lampen geoffice ist, zur Speisung der weissen, im ontgegengesteten Rille zur Speisung der Artigen Lampen

Nehmen wir nun, wie es in der Fig. 7 dargestellt ist, an, der Stromkreis zu den weissen Lampon sei gesehlossen und behufs Dämpfung der Lampen mittelst des Kurbeloinschalters der halbe Drahtwiderstand c eingeschaltet, so wird der Strom, nachdem er die Bleisieherung Bs durchflossen hat, in den Kurbeleinschalter a eintreten. Letzterer gestattet Drahtwiderstand in 29 verschiedenen Abstufungen in den Lampenstromkreis einzuschalten. Der Strom, welcher in das Contactstück m eintritt und durch die Achse der Sehleifkurbel austreten muss, nimmt, da eine unmittelbare Vorbindung zwischen letzterer und m fehlt, den Weg durch die Dräbte des Widerstandrahmens c und tritt durch das Contactstück n in die Kurbel. Diese vorlässt er durch ihre Achse und geht, nachdem er den Einschalter c durchflossen hat, in die weissen Lampen. Der Lauf des Stromes ist in der Zeichnung durch Pfeile mit zunehmender Anzahl der Fahnen bezeichnet. Wird der Strom umgeschaltet, so dass er durch die rothen oder grünen Lampen geht, so durchfliesst er, entsprechend wie oben beschrieben, die Bleisieherung Bs, den Kurbeleinschalter b und den Drahtwiderstand f.

Die 900 Lampen, welebe jeden Abend im Betriebe sind, liefern übrigens meist weniger als $900\times16=14400$ Normalkerzen, da eine gewisse Anzahl der Lampen, z. B. die des

Zusohauerraumes, während gespielt wird, weit unter ihrer normalen Liehtstärke brennen.

Die stamstillen Gibtlichtlampen des Zusebauerraumes sind mit offermig gestaltoten Mildelgasgheiden ungeben, welche das Liebt kilder um etwa 40 pCt. absolvatelen. Eine Dümpfung des Liebtes, welche un verliegenden Enlie offenber eine zu starfen ist, ist gegen den Willen der Elektretechniter auf besonderen Winseln der Architakten gesehnben, weil letztere besonderen Winseln der Architakten gesehnben, weil letztere besonderen Winseln der Architakten gesehnben, weil letztere besonderen Winseln der Architakten gesehnen zu viele Schäden an livre Decoration, namendlich an der Vergoldung, entdeken wirden. Ebmen eind die misteln Lumpen an den Kronlaechtern im Teroprohaus und im Foyer mit Milbelgischen verselnen. Dagegen spenden die in der Vorhalle an Bassents gesehmackvollen zweiarmigen Trägern angebreichten und die in den Pirura vorkandsonn Lampen ihr velles Liebt. Die Brenndauer der Gibhlampen sell mindestens 700 Standen betragen.

Als Nothbeleuchtung dienen 80 von aussen ventilirte Laternon, welcho sehr geschickt vertieilt sind.

4. Beleuchtung des Platzes vor dem Theater.

Hiera diesen fünf Grammeische, durch die fünfpferdige Dynamomaschies desselben Erfinders gespeitzt Begenlichtlampen on je 100 Normalkorzen. Genude wie beim Snoy- Theeter in London wird der Pitzt vor dem Theeter zweckmässigerie in London wird der Pitzt vor dem Theeter zweckmässigerweise durch Begonlicht oftendelt. Es ist durchaus falseb, die Gibblichtbeleuchtung gegen die Begenlichtbeleuchtung in den Kampf zu filtwei; beled Beleuchtungunten kommon friedlich noben einzuder bestehen Das Degenlicht, well es billig grosse Lichtquellen Hefert, wende man zur Beleuchtung von freier Pitzten, Behnbefählele, grossen Febrükränen und

Zum Schlusse möchte ich nun ausführlich auf die Verzüge der elektrischen Glühlichtbeleuchtung gegenüber der Gasbeleuchtung eingehen.

Die Lichtwirkung der Glühlampen ist eine ausserordentlich glänzende; sie gehon ein angenehmeres und weisseres Licht als Gas. Die Farben werden weniger verändert als durch das Gaslicht; denselben wird ein besonders warmer Ton verliehen, und selbst kältere Farbentöne gelangen zu lehhafterer Wirkung. Einer Verhindung von Bogenlicht und Glühlicht zur Beleuchtung von geschlossenen Räumen, wie solche im Münchener Theater stattgefunden und aus ökonomischen Gründen empfohlen wird, möchte ich nicht das Wort reden. Das Bogenlicht, selhst wonn es, wie in München, durch matte Scheihen gemildert wird, ruft immer kalte Farhentone hervor. welche Thatsache gerade hei einer Verbindung heider Beleuchtungsarten hesonders hervortreten muss. Entschliesst man sich einmal zur Einführung der elektrischen Beleuchtung, so heleuchte man geschmückte Ränme, um sie zu voller Wirkung zu bringen, ausschliesslich mit Glühlampen. Ein weiterer Vorzug der letzteren besteht in der Ruho und Gleichmässigkeit, mit der sie hrennen; dies macht sich besonders auf der Bühne angenehm hemerkhar, we sonst die vielen offen hrennenden Gasflammen durch ihr Flackern die Schauspieler sehr helästigen.

Infolge der geringen Warmeentwicklung der Glahlampen nimmt die Temperatur im Laufe des Ahends nur sehr wenig zu. Bei einem fast vollen Theater in Brünn betrug die Temperatur am Anfange der Yorstellung im Parquet 16° R., im Amphitheater 155° R., gagen Ende der Verstellung entreprecised 156° R. und 1° S. Die Temperatur var alse valkrend der Verstellung unter dem Deelen nur um 15° R., gestigen Im Savey-Theater bettung die Temperatur bei anzewerkentem Hause und gegen Ende der Verstellung ebernfalle um 15° R. Die zu Lett im Theater hebält aber nicht um eine angewehnen Temperatur, sondern sie wird auch nicht uwrderhen wird dies bei der Gasbeleuchtung durch die Verbremungspreducte des Gasses der Fäll ist $^{\circ}$. Die elektrische Beleushtung wird daher im gemundleitlicher Himieckt sowell anf die Zasehauer als auch numentlich auf das Sühnempersonal einen seiter ganstige nichtse souther.

Aus diesen Eigenschaften des elektrischen Lichtes folgt ferner mit Nothwendigkeit, dass die Docontionen und Maßerien viel 1 auger erhalten hielben und daher die Kasten für Ermesterung, bezw. Auslesserung derselben hodestend vermindert werden. Und in der Phat, das Sevoy-Theater, welches doch hereils ver 1/4 Jahren ordfinet worden ist, macht in seinen Insanstrumen den Bindruck, als wenn es ehen aus der Hand des Architekten hervougsgangen wäre. Die seladdliche Wirtung der Gasieleunbung degegen kunn, wenn es sich nicht nur um gewöhnliche Docontionsgegenstuch handelt, sehr nur gewöhnliche Docontionsgegenstuch handelt, sehr im Foyer der grossen Fariser Oper chrige der von ersten finksisten ausgeführten Dockongennaße sehen nuch wenigen

*) We weige its Eath at Anvendung elektrischer Beisenhauser von eine Meisen aus der Thatenda herver, dies mit Britten aus der Thatenda herver, dies im Brittener Thatenda, wellede auf einer Brittener Thatenda, wellede auf der Steiner St

Jahren durch Ablagerung einer Schicht von Ausseheidungsstoffen, von der Gasverbrennung herrührend, fast gänzlich vernichtet worden.

Ein Hauptgrund zur Einführung der elektrischen Beleuchtung in Theatorn liegt in ihrer grossen Sicherheit gegen Fenersgefahr.

Die Construction der Glühlampen schliesst die Möglichkeit, dass ein in ihre Nähe gebrachter, leicht hrennharer Körper Feuer fangen könnte, ans. Bricht die Glasgloeke entzwei, so erlischt die Lampe infolge Verbrennens des Kohlenhügels angenblicklich. Eine Entzündung in der Nähe hefindlicher, leicht brennharer Körper tritt, wie Versuche gezeigt haben, selbst in diesem Falle nicht ein. Durch die Leitungen kann Feuersgefahr nicht entstehen, wenn die Anlage se sorgfaltig ausgeführt ist, wie im Savoy- und im Brünner Theater, d. h., wenn eine genügende Anzahl Bleisicherungen in den Leitungen vorhanden ist. Tritt in diesem Falle dann an irgend einer Stelle der Leitung durch kurzen Schluss eine Erhitzung der Leitungen ein, so schmilzt der zunächst eingesehaltete Bleistreifen ah, hevor der Draht zum Glühen kommt. In Brünn hat man sich durch Versuche überzengt, dass hei einem Kurzschluss in der That diese Sicherheitsverrichtung richtig wirkt. Die sämmtlichen von Hrn. Schilling im Journal für Gasbeleuchtung 1882 Bd. 25 S. 639 u. f. angeführten Brände, welche auf ein Glühendwerden von Leitungen zurückgeführt werden, sind entweder vor dem Bekanntwerden der Bleisicherungen entstanden, oder aher man hat die Benutzung der letzteren versitumt. Auch das von Hrn. Schilling vorgeführte Bedenken gegen elektrische Beleuchtung dürfte hinfällig sein, dass bei ausbrechendem Feuer diese Belouchtung eogleich ganzlich versage; die Leitungen eelbst sind mindestens nicht mehr geführdet, als die Rohrleitungen der Gasheleuchtung, und die

Zerstörung der einzelnen Liehter kann nur in dem Maese allmählich erfolgen, wie das Feuer um sich greift.

Man bedenke nun, wieviel leichter in einem durch Gas orleuchteten Thoater Feuersgefahr entstehen kann. Hier brennen offene Gasflammen, die nur durch hreitmaschige Druhtgitter von den brennbareten Stoffen getrennt sind. Ich möchte Sie, m. H., daran erinnern, wieviel Tanzerinnen sehon an den Rampenlichtern Feuer gefangen und zum Theil elendiglich verbrannt sind. Und wie geführlich ist das Ansteeken der Gasflammen, welches gewöhnlich durch kleine, auf einer Stange hefestigte Spirituslampen geschieht; soll doch auch das grosse Wiener Unglück durch Unversichtigkeit beim Ansteeken der Soffittenflammen entstanden sein*). A. Fölsch giebt in seinem Buch über Theaterbrände an, dass diese meistens durch offenes oder sehlecht geschütztes Licht entstanden sind. Eine ganze Reihe von Bründen sind ferner durch Gasexplosionen verursacht. Die auf der Bühne befindlichen, meist offen liegenden Gasröhren sind verhältnissmässig leicht einer Beschädigung ausgesetzt; sehr häufig entsteht Feuersgefahr durch ein Undichtwerden oder Zerreissen der Schläuche, welche den Versetzstücken das Gas zuführen.

Die Gefahr, dass Menschen durch den Strom infolge irgend eines Zufalles erschlagen werden könnten, ist bei der geringen Spannung des hei der Githlichtbeleuchtung in Anwendung kommenden Stromes überhaupt ausgeschlossen.

^{*)} Dass sach die Feuerversieherungsgesellschaften von der grösseren Feuersieherheit der elektrische der het in den der großesten Berenge dand, gelts webl am besten aus der Thatestele herre, dass die Primien sowehl des Sevey-Pieceter eils des Brünner Them Bedriger sind die hel Verwendung von Gasbelenchtung. Bei lektroren Pheater beierigt die Primie 12 aussetzte fraher das Großes der Großes der Primier der State der Primier der State der Primier der State der Primier d

Der Director einer unserer grüsereren Bühnen, welcher ebenfallt das Brinner Thester singelrend besichtigt hat, sprach mir gegenüber seine Anzicht dahln aus, dass die elektrische berüchtungsenlage desselben allen dem Erforternissen entgezicht, welche man en eine Bühnenbelsenhung stellen misse. Er meinte nur, dass eich die Herstellung der farbigen Lampen derne Ubekreitehen denrolben mit Gelatinschlüten nicht bewähren würde, und dass man beseer tilm würde, die Gilchalbempe gleich aus farbigen Gloss-berusstellen. Mich dewührmann lobte besonders die Ruhe md Gileichnissigkeit des Lüchtes und meint, dass die neue Beleuchtungster wegen ihrer geringen Warmeentwicklung besonders einen ginstigen Eintens auf den Gesundehtenstand der Schauspieler aunthen missen. Die elektrische Gibhlichtbeleuchtung sei unzweifelbaft die suchtniffig Beleuchtung der Bihnen.

Um Ilmen, m. H., noch einen weiteren Beweis für die Brauchbarkeit der Glühlichtbelenchtung zu geben, erlaube ich mir, Ihnen einen Abschnitt aus einem Berichte vorzuleeen, welchen die kaiserl. Generaldirection der Reichseisenbahnen über die in grösserem Massstahe mit elektriecher Beleuchtung ausgeführten Versuche veröffentlicht hat. Es heisst in demselben: "Die Generaldirection glauht aus den vorliegenden Ergebnissen schliessen zu dürfen, dass die elektrische Beleuchtung im allgemeinen bezüglich der Kostenfrage mit der Gasbeleuchtung in wirksamen Wettkampf treten kanu, und dass insbesondere die Glühlichtbeleuchtung wegen ihrer Gefahrlosigkeit, wegen der geringen Wärmeentwicklung der Lampen, wegen der Ruhe, Gleichförmigkeit und angenehmen Fürbung des Lichtes, sowie schliesslich wegen der hequemen Unterhaltung der Beleuchtungseinrichtungen für geschlossene Räume, Wartesäle und Bureaux den Vorzug vor jeder anderen Beleuchtungsart verdient".

Auf diesen Bericht der kaiserl. Generaldirection ist meiner Mourag nach der grosste Werth zu legen, da wir in demeelben ein unparteisielor, nicht durch geschäftliche Interossen besinflustes Urteil finden. Die ksiern! Generaldirectionbeabsichtigte lediglich, durch lifter Versuche die beste Beleachtungeurt für den neuen Bahnhof in Strassburg ausfindig
zu nachen.

Als Nachtheil der elektrischen Beleuchtung wird angegeben, dass dieselbe nicht so grosse Betriebssicherheit biete wie die Gasbeleuchtung. Aher, m. H., würde sich der Besitzer des Savoy-Theaters, in welchem eine vollständige, jeden Augenblick brauchbare Gaseinrichtung vorhanden ist, nachdem er die elektrische Beleuchtung ein Jahr lang in seinem Theater erproht hatte, wohl entschlossen haben, dieselbe nun endgültig einzuführen, wenn dieselbe nicht die genügende Sicherheit geboten hätte? Ich möchte meinen, dass ein Jahr genüge, um alle möglichen Erfahrungen zu sammeln. Das Brünner Theater war ja freilich erst vier Wochen im Betriebe. als ich dort war. In dieser Zeit hatte die Beleuchtung aber nicht ein einziges Mal, auch nicht für Secunden, versagt. Und ich meine, die Unternehmer, welche die Einrichtung der Brünner Anlage übernommen hatten, mussten ihrer Sache wohl sehr sicher sein, denn sonet hätten sie die echweren Strafbeetimmungen, welche im Vertrage mit der Stadt Brünn enthalten sind, nicht angenommen.

Ueber die Anlage- und Betriehskosten der beiden Anlagen kann ich Ihnen leider nicht eo genaue und anethirliche Zahlen geben, wie ee winscheuswerth wirz. Die Anlage und Betriebskosten der provisorischen Anlage des Savoy-Theaters sind offenbar viel höher, als sie sein würden, wenn die Anlage einen danermden Übartkiet rürge. Die in technischen Kreisen vielfach verbreitete Metung ab eil die elektrieche Beleuchtung viel theurer als die Gasbeleuchtung, halte ich nicht für eine richtige. In dem bereits vorher erwähnten Berichte der kniesrijelen Generaldirection laben die vergleichenden Vereuche hinsichtlich der Koeten folgendes ergeben:

Es betragen die Kosten für die Brennstande

						und Lampo	und Normal- kerze	
1.	oiner	Differentiallampe	211	1200	NK.	64,61 Pf.	0.0589 Pf.	
2.	22	"	"	350	22	30,78 "	0,0879 ,,	
3.	77	"	"	150	11	18,44 ,,	0,1229 ,,	
4.	13	Glühlichtlampe	27	16	"	2,87 ,,	0,1481 "	
5.	"	,,,	"	8	27	1,19 "	0,1488 "	
6.	"	Gasflamme	"	12	"	2,13 "	0,1775 ,,	

Bei Berechnung der Kosten der Gashelenchtung ist ein Verbrauch von 1201 für die Flamme und Stunde zum Preise von 16 Pfg. für 1 cbm, den örtlichen Verhältnissen entsprechend zu Grunde gelegt.

Eo sind hier die Solhetkosten der elektrischen Beleuchtung dem Verkaufspreiee die Gasses gegenüber gestellt. Letztere Zahl misste insofern noch eine Berücktigung erführen, als man diesellse um dem Betrag der Amoritautien um Verstenung der Gandelendungsenäppe im Hause und deren Bedienung vongrüssen misste. Man wird in den neisten Fullen, so unrichtigt sen die en ersten Angewhick auch erreichein. Wei en hier geschehen, die Solbstkoeten der elektrischen Beleuchtung mit dem Verkaufspreise des Gasse vorgleichen mitsen, da. Z. die immitten der Studt glegenem Hester u. s. w.

sich nicht jedes eine besondere Gasanstalt einrichten können. violmehr darauf angewiesen sind, das Gas von einer grösseren Anetalt zu kaufen. Mag das elektrische Glühlicht immerhin pro Normalkerze und Zeiteinheit theurer kommen, so eind doch die mit seiner Einführung verbundenen Vortheile für viele Zweeke so hedentende, daes die eventuell etwas höheren Kosten nicht in Frage kommen. C. William Siemens in Loudon ansserte sich, als er vor einer Parlamentscommission vernommen wurde, über die Beleuchtungsfrage im allgemeinen folgendermassen: "Wenn im allgemeinen vou den Kosten der Gashelenchtung und der elektrischen Belouchtung die Rede ist, so denko ich, sie werden sich so ziemlich gleich sein. Wenn man zwischen beiden Beleuchtungsarten zu wählen hat, so werden es meist andere Eigenschaften sein als die Kosten, welche entscheiden".

Auch darf man vor allen Dingen nicht vergreen, dass nichge Einfährung des elektrischen Lichtes verschiedene andere Ansgaben erhehlich kleiner werden. Entens sinkt die Fenerversicherungereinnis, sodann hrundit die Ausstatung des erleuchteten Rammes weniger oft anlegfeischet in werden; endlich können die Läftungsvorrichtungen vereinficht werden. Dagegen werden gewisst die Einahmen der Thester steigen, da die hisher im Sennner in demselhen vorlanndene, unerträgliche Hitso nicht mehr vom Besende abskredene wird.

Derjenige Umstand, welcher der allgemeinen und haldigen Einfilhrung der elektrischen Belsenchtung, namenlich in den beweits bestehenden Thaetern, allein antegewanden dürfte, bestaht in deren hohen Anlagekosten. Bister ist es allerdinge erforderlich, dass sich jeder Vorbraucher elektrischen Lüchtes eine eigene Maschimeannlage errichtet, die weit daber in Berün bald nicht mehr nothwendig sein. Ich bin in der Lage, Ihmen von zwerfaniger Sein mittheilen zu können, dass es zu den Anfgaben der nenen Zeiten Gesellacht*, deren Gründung in kitrasster Zeit hier bevorsteht, gehören wird, zmadent kleinere Centralistationen einzurichten, von denen der Strom jo nach Bedarf an einzehe Theater, Waarsennagazine z. s. v. abgegeben wird. Höffen wir also, m. H., dass die Tage nicht mehr fern sind, wo wir me in unseren Theatern des Vorzuges der elsk-trischen Bebeuchtung erfrenen und nicht mehr im Schweisse unseres Angesichtes Kunst genlessen müssen. Denn wer die elektrischen Theater-Beleuchtungen in London und Britm gesachen latt, muss zugeben, dass wir et was auch incht werden des Versuches belinden, sondern dass wir etwas Perdigs und zur elligeneinen Einführung Reifes vor uns haben.

Theater in Havanna auf Kuba.*)

Im Amsehluss an den im Mitralefte der Zeitschrift S. 101 vorffenstlichten Vortrag über die elektrische Beleuchtung des Savoy-Theaters in London und des Saudtheatern in Brünn geben wir in folgendenn nach einer sehr interessenten Mittaling im "La Laminter diectrigue" (1883, S. 29) eine Beschreibung der Beleuchtungsamlage eines kleinen Theatern in Havanna auf Kubn, welches berwie seit einem Jahre ummterbrochen nach Edison'schem System elektrisch beleuchtet wied.

Das Theater wurde unsprünglich durch Gas erleuchtet. An die Stelle von 342 Gasbrennern sind 182 Edison'sche B-Güblampen von 18 und 11 A-Güblampen von 16 Normalkerzen Lichtstärke getreten. Die geringe Anzahl von Güblampen int Vorgleich zu den Gaslumpen ist durch die sehr schiechte Beschaffenheit des Leuchtgasses zu erklären.

^{*)} Die felgenden Beschreibungen des Theaters in Kuba, des Bijeu-Theaters in Besten und des Théatre du Pare in Brüssel sind im Juniheft 1883 der Zeitschrift des Vereines deutscher Ingenieure veröfientlicht werden.

Die Vertheilung der Glühlampen im Theater ist folgende: 2 Soffitten zu je 10 L. 20 " 36 an den drei Gallerien angebrachte Trager zu jo 2 L. 72 " 4 Träger zu je 4 L., angebracht an den beiden Seiten der Bühne, nahe den Prosoeniums-24 in den vier Fluren gleichmässig vertheilte L. 24 " 6 L. auf den Fluren vor den Spiegeln . . . 10 in verschiedenen Legen augobrachte L. 10 Summo 182 B-Lampen. Ueber den Eingüngen zu dem Theater . . . 3 " Summe 11 A-Lampon. Zur Erleuchtung des Maschinenraumes dienen ferner 20 A-Lampen.

Dio Lampen der obersten Galheire ind mit Redisotoma ass weissen Poerzellan ausgeritäte. Die Soffitienlampen sewoll als die Rampenlampen sind mit Reflectoren aus politiem Risenbeche verselne. Durch die Anbringung dieser Redisotom, welche bei den Glüblampen direct über denselben angebracht werden können, wird bewirkt, dess das genze Lieht auf die Bilme gewerfen werden können, wird bewirkt, dess das genze Lieht auf die Bilme gewerfen werden konne gewerfen werden konne auf der Bilme diese danzeln härstelben bleuchelotte wird. Es ist oben ein gresser Vernig der Glüblampen, dass sich ein auf der Bilme diese danzeln harriegen lässet. Die Diumpfung der Lampen wird auf einfinde und bekannte Weise durch Einschaltung vom Widenstaden in die Liefungen bewirkt.

Den zur Speisung der Glühlampen erforderlichen Strom ließern zwei Edisen webe Dynamomaschinen, Modell Z, zu deren Betrieb eines Hyferdige Dampfranschine diest. Des Maschinenhaus befindet sich 36,5 m vom Theater entfernt. Die beiden Dynamomaschinen arbeiten in getwennen Stronthreisen. Die eine speist die Lampen, welche sich über dam Eingange, in der Verhalb, in den Logen, in den Fluren und auf der obersten Gallarie des Zuschanerraumes befinden; die andere versorgt die Lampen der beiden unteren Gallarien, dar Stifftten, der Hampe und der vier seitlich der Buhne angebrachten Lescohter.

Die Beleuchtung ist täglich 5 Stunden im Betriebe, dies macht im Jahre 1825 Bremstunden. Es liefern also die 182 Lampen von 1 Carcel Lichtstärke (1 Carcel ungeführ = 8 Normalkerzen) 332 150 Carcel-Brennstunden, die 31 Lampen von 2 Carcels 113 150, sämmtliche Lampen zusammen alse 445 500 Carcel-Brennstunden.

Die Kosten der Anlago, bestehend aus einer Dampfmaschine, einem Kessel, zwei dyname-olektrischen Maschinen nebst Zubchör, einem Reinen Elektromotor, welcher zum Betrieb einer Milmaschine dieut, former den Leitungen, Lampen u. s. w., betregen 2000 fb. Es mus jedoch hierzu bemerkt werden, dass dieselben in Anbetracht der Kleinheit der Anlage verhältniesmässig gross eind, und dass sich dieselben bei einer grossen Anlage unbedingt niedriger stellen würden.

Die täglichen Betriebskoston sind folgende:											
200 kg Anthracit-Kohle, 47,5 fr. die Tonne	9.50 fr.										
Ein Maschinenwärter	0,00 ,,										
Ein Heizer	12,50 ,,										
Schmieren etwa	2,50 ,,										
täglich zusammen 54,60 fr.											
Die jährlichen Unkesten betragen:											
Vorzinsung und Amortisation mit 20 pCt 4000 fr.											
Erneuerung der Lampen; dieselhen bronnen durch-											
schnittlich 800 Stunden und müssen daher unge-											
fähr 21/2 mal im Jahr ernouert werden. Das macht											
533 Lampen; jede kostet 3,50 fr											
Betriehskosten 54,50 fr. X 305	892										
zusammen für 145 300 Carcel-Brennstunden 25	757 fr.										
also für 1 Carcel-Brennstunde 0,	0578 fr.										

Der franzésieche Berichtentatter bemett, dass die in Rechung gesogenen Posten für die abkrische Belenotlungsgenen Posten für die abkrische Belenotlungsgenen Posten in der Beschieder sollt iche Gegreis hat zicht ablein seinen Grund in den hohen Preise der imperiture ausgeliehen Kolle, sondern anneutlich in dem gressen Verlust an Gas in den Leitungsofbren, ein Verlust, welcher mit zie 30 pt. Ge schrichten Gesse betreigt. Diese grossen Verluste werden theils durch eine grosse Ablagerung von Ausschiedungsproducten aus dem oder mangelhaft gereinigten Gesse verureschie, thelle haben sie ihren Grund in der verschiedenen Ausdehung der Gesometer und der Rohren über verschiedenen Ausdehung der Gesometer und der Rohren über

Tage, welche einer trepiechen Sonne und den Röhren unter der Erde, welche einer viel niedrigeren und gleichmäseigeren Temperatur ausgesetzt sind.

Eine Unterbrechung der beschrichenen Anlege hat, wis bereits eben erwähnt, bäher inhet setzigefunden das Zeitsonfeste betwerkte her seine Stellenderungssystem hat sich abe anch hier selter gub bewährt. Eine gunz besonden Annahmildheit verschaff? die 'elektrische Balenchtung in ütem tropischen Lande hiere gringen Wärmesstucklung wegen dem Pablitum und den Schauspielern. Der Unterschied der durch die Getaund die selektrische Beleucktung vorunschaten Temperatur im Thoster bei gleicher dausserer Temperatur ist mehrere Male gemessen worden; er betrug nicht weniger als 8° Cl.

Das Bijou-Theater in Boston.

Die Vertheilung der Lampen im Thouter ist folgende. Die Bühne wird orleuchtet durch 192 mit Reflectoren verschone Lampon, welche in drei Roihon an den Portalcoulissen angebracht sind, und durch 140 ebeufalls mit Reflectoren verschene Soffittenlampen. Ramponlampen sind nicht vorhanden. Au dem im Zuschauerraume befindlichen sehr schönen Krystall-Kronleuchter sind 60 Lampon angebracht; ausserdem sind noch drei kleinere Kronleuchter mit je 18 Lampen verhanden. In den Logen und Gallerion bronnen 88 Lampen. Die Troppe wird durch 3 Kandelaber mit je 12 Lampen und das Feyer durch 1 Kandelaber mit 6 und darch 2 Kandelaber mit je 3 Lampen erleuchtet. Zur Beleuchtung der Bureaux dienen 4 Krenleuchter mit je 4 Lampon und einer mit 9 Lampon. Endlich befindet sich ver dem Theater ein Kandelaber mit 40 Lampen. Es mag bemerkt worden, dass die Anlage innerhalb zwei Wochen nach dem gegebenen Auftrage ausgeführt worden ist.

Das Théâtre du Parc in Brüssel.

Beleuchtung des kgl. Residenz-Theaters in München nach Edison's System.*)

Der von um im Märzhefte der Zeitschrift ausgesprochene Wunsch, möglichste bald anch die dentschen Thance relektrisch beitentlicht zu sehen, seinen seine seinen sei

Das kleine, etwa 600 Perencen fasseniel Residenz-Theater, welches seiner reichen; im achönsten Baredestil gehaltenen Ansstatung wegen für tile olektrische Örhähelteholeuchtung sich besondere olignet, wird dürch ungefähr 800 Edizon-Gehlungen orientlicht. Den Strem liefern der Edizon siche Dynamonaschinen, Modell K, von desen jede für 250 seehsnkorige bewer. 900 achlekerige Lampen construit ist. Disselben arbeiten in einem Stromkreise und sind parallel greachtet. Als Motoren dieme dreit Compuned-Dampfraschinen der Firma Ruston, Proctor & Co. in Lincoln von je 40 PRikr., welche in dem swiesben dem Bedienz-Theater und dem Hof-

^{*)} Aus der Zeitschrift des Vereins deutscher Ingenieure. Juliheit 1883.

und National-Theater befüllichen Hofe anfigestellt sind. Vermittatei telearer Tvelbrionen, deren Enden.se mit einanen
mittatei telearer Tvelbrionen, deren Enden.se mit einanen
kraft auf eine gemeinsame Trunamissionswelle abertragen, von
welcher aus die dere im Kallergeschese des Theaters stehen
den Dynamennsschinen getrieben werden; letztere machen
Di Unfrichungen in der Minute. Der erzeuge Strem wird
unweit von den Dynamennsschinen, in ührlicher Weise wie
bei der Brümer Anlage, in zwei Steuntwisse gebelsit, von
denen der eine die seg. Hunsdeltung, der andere die Leitung
für den Ballen-zu M Zaschearrenn bildet. Die Vertheilung
der Lampen in gausen Theater ist die felgende:

manarerung:						
Treppen, Flure u. s. w	٠.		58	sechszehnkerzige	Lamper	
" "			6	achtkerzige	,,	
Ankleidezimmer			24	sochszehnkerzion	, "	
		-			,	88
Bühne:						
7 Seffitten zu je	35	<u> </u>	245	sechszelmkerzien	T.nmnon	
2 Pertalcoulissen,,	10) —	90		Dampon	
12 Ceulissen , ,	-	:=	70	"	22	
6 Versetzstücke " "	10	_	12	22	"	
				"	**	
	20	=	40	"	22	
Rampe	٠	•	40	"	,,	
Unterbühne Sehntirhadan	٠	٠	7	n	**	
Schnürbeden		:_	10	»	"	
Zuschauerraum:					"	506
Kranlanalitan						
Krenleuchter Balcen-Belenehtung			60	sechszehnkerzige	Lampen	
Balcen-Beleuchtung	٠	-	96	acbtkerzige	n	
Maschinanya						156
Maschinenräume	٠	•	16	echszehnkerzige	Lampen	16

Im genzen 766.

Während bei Gasbeleuchtung die Bühne den Eindruck machte, als sei sie mit dickor, zitternder Luft erfüllt, erschienen bei der elektrischen Beleuchtung alle Persenen und Gegenstände dem Auge ausserordentlich klar und nahe gerückt.

Das wessenkliche der Eknrichtung des auf der linken Seite er Bilme au ner Promenimmswend ungebrachten Lichstatzion-Regulinzuprantes ist benvitz im Murcherle d. Zeshift. d. V. d. 12g. S. 200 beschrieben werden. Es möge hier zuch angestührt werden, dess im Ganzon 29 Regulirungsbede) verhausten sind, und warer je 7 für die Coulisson, 7 für die Seifftens, 2 für die bestelen Seiten der Zampe, 4 für die Versetzstücke, 1 für den Krenderschier und 1 für die Belaconbelouchtung. An dem Begulirungspapparatie ist fenrer eine Verrichtung angebracht, durch welche es rengejicht sie, jude Lampengurpe plotzkich anfenchen zu lassen, d. h. den Bilte nachzenknon. Auf dem Puscheen Ellen bedinden sieh 136 Einschlanten verken aus der Stene durch biegame Leitungen den Versetzstücken zurgeführt wird.

Wie aus verstehender Beschreibung hervergeht, sind zur Herverbringung der Farbeneffeete nicht, wie in Brünn, besendere farbige, in getrennten Stremkreisen arbeitende Lampen

vorhanden, vielmehr dient hierzu ein sinnreicher, besonders für diesen Zweek von dem Ober-Maschinenmeister der kgl. Bülmen in München, Hrn. Lautenschläger, construirter "Universalapparat für farbige Beleuchtungseffecte", welcher im wesentliehen aus einer um das Glühlampengestell drehbaren Trommel aus farbiger, über Netzwerk gegossener Gelatine besteht und stehend, liegend oder hängend benutzt werden kann. Ein Urtheil darüber, ob die Vorriehtung im Brünner- oder die im Residenz - Theater am meisten den praktischen Bedürfnissen entspricht, kann, da beide Einrichtungen erst seit kurzer Zeit im Betriebe sind, noch nicht gefällt werden. Da bei der Brünner Einrichtung dreimal so viel Lampen, als zur wirklichen Beleuchtung der Bülme nothwendig, angebracht werden müssen, se vertheuern sich hierdurch die Kesten der Anlage erheblich; auch werden die hänfig hin und her zu bewegenden Soffitten- und Cenlissen-Lampengestelle verhältnissmässig schwer. Dagegen bietet dieselbe den Vortheil, dass sowohl die Regulirung der Lichtstärken, als auch die der Farbenwirkungen von einer Centralstelle aus für jede beliebige Gruppe von Lampen bewirkt werden kann, während bei der Vorrichtung im Residenz-Theater jede einzelno Trommel mittolst Schnurscheibe und Schnur von Hand gedreht werden muss.

Die Anlage im Residenz-Theater ist von Hrn. Philip Soubel im Antfrage der zur Ausbeutung der Erfühlungen von Thennas Alva Edisen in Deutschland begründelen Deutschen Edison Gesellschaft, welcher auch die Einrichtung elektrischer Beleuchtung im kgl. Theater in Stuttgart übertungen ist, ausgeführt worden.

Seit dem 28. v. M. wird auch das Manzeni-Theater in Mailaud mit Edisen - Glühlampen erleuchtet, welche den zu ihrem Betrieb erforderliehen elektrischen Strom von der grossen, daselbet nach dem New-Yorker Muster errichteten Centralstation aus erhalten; letztere soll vorläufig zum Betriebe von 3600 seohszelmkerzigen Glühlampen dienen, deren Zahl man aber auf 10000 zu erhöhen beabsiehtigt.

Zar Vollständigfest nuserer Berielte über eichtrische Inseterbelssehtungen möge noch benerkt werden, dess der orste Versuch dieser Art im Deutschland auf der Böhne des kgl. Opernhamses im Beriln durch den kgl. Ober-Muschluss-Linsepeter Him. Drand ausgeführt worden ist. Set dien 29. Mai 1888 wurden sinige Woeben lang allabendlich die beiden ersten Coulissen durch 24 elektrische Gilhalmpun erleuchst; dieselben brannten in drei Stromkreisen, von denen der eine die weisen, der zwiet die rothen und der dritte die grünen Lunpen enthielt. Die Regulirung des Lichtes gelang vellkemmen.

Im Asselius an die vorstehende Beschreibung der Muncheuer Eschieur-Tiester-Beleuchtag thelieu wir unzugaweise ein Gutachten mit, welches am 13. Juni d. J. ven dem
Geh. Ratio D. Max von Pettenkefer bür die Bebeuchtung
des kgl. Resideuer-Tiesteres im Münchon mit Gas und mit elektreisteme Lichte abegegeben wurde und wegen des helnen Ausehens seines Verfüssers sin besenderes Interesse beauspruchen
dürfte.

Um den Einfass der Gasbolenzitung und der elektrischen Belenehtung auf die Tompenstur und den Kollenstangehalt der Laft im ganzen Hause kennen zu ternon, wurden die hierzu erforderliehen Versuchen gleichzeitig im Farquet, im L und mit III. Rauge (Gallerie), und awar sewell bei leesem Hause, als auch wahrend der Theaterventellungen ausgeführt. Bei bestetzte Hause werzu jederand zwischen 600 und 600 Persoien im Zuschauerraum aurwesend; die Thernemeter wurden vin 10 m 10 Minnten beobachtet. Die Tomperatur stieg se-

wohl bei leeren, als auch bei besetzten Hanss vom tießten Skand am Arfang mit gene unbedeurbenden Solventungen unterbrooken bis zum holosten Stand am Ende. Die Ergeblnisse dieser Versuche haben sweifellen bewisen, wie verhaltnisse dieser Versuche haben sweifellen bewisen, wie verbrahlnisse dieser Versuche haben sweifellen bewisen, wie verbrahlnisse die Engelen der die deletzieße, mit Gegenatze zur Gasbeleuchtung; die nontuttweichtung in obersten Rauge bei Gasbeleuchtung if om al (9; zu 0,9) grösser als bei elektrischer Bebeuchtung; die Amperaturunkendele in den untern Raumen der Theaters waren natürlich geringer. Bei besitztem Hause betrug bei elektrischer Beleuchtung eager die Temperatur auf der Gallerie (33° C.) annahernd nicht mehr, als bei der Gasbeleuchtung im Zuruste (22; e.)

Eindlich muss noch hervorgehoben werden, dass bei Anstellung der Versuche mit der Gasbeleuchtung die Aussentemperatur niedriger war, als bei den Versuchen mit elektrischer Beleuchtung, so dass also letstere jedenfalls nicht im Vortheil war.

Der höchste beobachtste Kehlensäuregehalt betrug bei besetztem Hause:

bei Gasbeleuchtung 2,3 auf Tausend bei elektrischer Beleuchtung . 1,8 "

Der Unterschied ist geringer, als man erwarten sollte, da doch bei der Benutzung von Zelison'schen Glüthungen eine Kohlensaturentwicklung nicht stattfindet, die Zunahme an Kohlensture also in diesem Full ausschliesstich von den im Tenketr befindlichen Manechen herritht: Es muss jedoch besonders hervorgehoben werden, dass bei der elektrischen Beleuchtung die besonders schädlichen Producte der unvollstandigen Verbranung der Leuchtgasse, wie Kohlenoxyk,

Kohlenwasserstoff und Schwefelwasserstoff überhaupt nicht in die Latt gelangen. Uebrigens legt Prof. von Pettenkofer den Kohlensturbeobenchungen einen besonderen Werth nicht bei und ist vielmehr der Ansicht, dass dieselben öfter und besonders an mehrenen Punkten des Theaters ausgeführt werden missten, um ein sicheres Resultzt zu orhalten.

Auf Grund seiner Untersuchungen zieht Prof. von Pettenkofer die folgenden Schlüsse:

 dass die elektrische Beleuchtung im hohen Grade die Ueberhitzung der Luft im Theater verhindere;

2. dass sis allerdings an und für sich nicht im Stande sei, die Lüftung des Thesters entbelricht zu machen, dass sie aber eine geringen Läftung desselben erforderen als die Staebeuentung, bei welcher die Lüftung nicht zur gegen die Lüftverdehniss durch Mensechen, soedern such gegen die Hitze und die Verbrenungsproducte der Planme gerichtet werden müsse, während sie est ein sichtstellen Polescheitung zur mit dem Athem und den Hautsaudusstungen der Mensehen und deren Polger zu thun habe. Das Stuttgarter Residenztheater ist bei seinem im Laufe des Sommers 1883 stattgelabten Umbaue gleichfalls mit elektrischer Heleuchtung nach Edisou's System versehen werden.

Der banliche Theil*) der ganzen Anlage zerfällt in das Kesselhaus mit dem Kamin und das Maschinenhaus, zwei einstöckige massive, mit schmiedeelsernen Dachstühlen überdeckte Gebäude von ie 260 qm Grundfläche, welche hinter dem Theatergebäude errichtet sind. Im Kesselhause befinden sich 4 nebeu einauder eingemauerte Dampfkessel (Patent G. Kuliu in Borg) mit rauchverzehreuden Fenerungen (System Tenbrink). Jeder Kessel besteht aus einem Oberkessel von 1,10 m Durchmesser und 6,02 m Länge, 2 darunter liegenden Verwärmern ven je 0,63 m Durchmesser und 5,39 m Länge, einem grösseren und einem kleineren Quersieder. Die gesammte Heizfläche jedes dieser Kessel berechnet sich auf 33 om, und da für den regelrechten Betrieb der Damnfmeschinen und der Centraldampfheizungsanlage 3 Kessel ausreichen, se verbleibt der 4. Kessel für die Aushilfe. Die mit allen erforderlichen Heiz- und Sicherheitsarmaturen ausgerüsteten Kessel werden durch eine Dampfpumpe, sewie durch eine zweite Speisevorrichtung, bestehend in einem Injector, aus der Neckarwasserleitung gespeist. Die Kessel sind auf 8 Atm. Heberdruck concessionirt Der den 4 Dampfkesseln gemeinsame Kamin ist 35,5 m hoch and in das Innere des Theatergebandes verlegt.

In dem Maschinenhause befinden sich, ebenfalls von G. Kuhn geliefert, 2 Compounddampfmaschinen mit Condensation und von je 60 bis 100 Pferdekraft bei 180 Umdrehungen, 4 dynameelektrische Edison'sche Maschinen (Modell K), jede für 250 Glühlampen von 16 Nermalkerzen, eine kleine dynamoelektrische Masehine (Modell E) mit besenderem Motor (Dreicylindermasohine, 400 Umdrehungen) für die Nothbelenchtung am Abend und für die Tagesproben auf der Bühne; ferner der Stromregulirapparat und die Transmissionsanlage, welche die Maschinen mit einander verbindet; ausserdem sind nech die Fundamente für eine dritte Cempounddampfmaschine und 2 weitere Edisen-Maschinen von gleicher Grösse wie die ebigen für die etwa einzurichtende elektrische Belenchtung des kgl. Residenzschlesses vergeschen. Die Dampfmaschinen mit Meyer'scher Expansionssteuerung, welche mittelst Knüttel'scher Regulatoren bethätigt werden, zeichnen sich bei der sehr hohen Umdrehmagszahl (130) durch rubigen Gang aus; sie sind selid construirt und so angelegt, dass bei eintretender Reparaturbedürftigkeit einer der beiden Maschinen die andere zum Betriebe der Gesammtaulage herangezogen werden kann. Die Schwingräder sind als Riemenscheiben ansgeführt und übertragen die gesammte Kruft der Maschinen , auf die in einfacher Weise am Beden angeerdnete Transmissionswelle mittelst Lederriemen und Reibungskupplungen (Patent Dohmen-Leblanc). Direct ven der Transmissienswelle, welche mit 300 Umdrehungen in der Minute läuft, werden gleichfalls mittelst Lederriemen die 4 neben einander aufgestellten Edisen'schen dyname-elektrischen Maschinen, deren Armaturen mit mehr als 900 Umdrehungen umlaufen, in Bewegung gesetzt; mittelst Klauenkupplung auf der Zwischenwelle lassen sich diese Dynamomaschinen während des Betriebes ausrücken.

Die vier Edison-Maschinen sind durch Parallelschaltung

^{*)} Auszug aus einem in No. 4 1894 der Zeitschrift des Vereines Deutscher Ingenieure veröffentlichten Artikel.

mit dem eines Hamptdeels verbunden und von diesem unter der Pithen zweit Hamptweige abgeleitet, von denen der eine mu Bethnenesquister führt und der andere die Hamisteitung Bethnenesquister führt und der andere die Hamisteitung bethem der verberen in der Biremitreise gedeheit ist. Die Elektremagnete der vier Pynamomassehinen sind unter sich durch Parullesienhaltung verbunden, und wird deren Stromstührung durch istem Hamptegulater im Massehinanhaso verstärkt door geschwicht und dadurch die Gesammtleitstärkte im gauson Gebaufe geregelt. Ein Voltmeer dim tar Beobsehung der Spannang und ein opisioher Signalappant seigt durch jeweiliges fastitution einer rechenbewe einer grünne Lamps an, eb die Spanung über bew. unter die Normalbide gekommen is. Bei normaler Spanung über bew. unter die Normalbide gekommen is. Bei normaler Spanung über bew. unter die Normalbide gekommen is. Bei normaler Spanung über bew. unter die Normalbide gekommen

Die Beleuchtung des Zuschauerraume ist in 2 Stremkreise getheilt: Kronleuchter und Balkonbeleuchtung; letztere kann auch wieder in drei einzelne Stromkreise getrennt werden.

Der Bühnenregulator gestattet, wie oben echen bemerkt, die Beleuchtung von der grössten Helligkeit bis zu vollständiger Dunkelheit in allen Schattirungen überzuführen, und auf der Bühne lässt sich das Licht durch Verschieben farbiger Gelatineschirme mittelst eines besonderen Mechanismus je nach Bedürfnies gelb, roth oder grün fürben. Am Regulater ist ferner eine Vorrichtung angebracht, durch welche Blitze oder Wetterleuchten nachgeahmt werden können. Dies geschicht durch Bewogung eines eigenen Hebels, durch welchen die im Stromkreise bofindlichen Widerstände auf einen Augenblick kurz geechaltet worden, infolge dessen die Lampen hell aufleuchten. Die Beleuchtung des Zuschauerraumes geschieht in der Regel durch den Kronlenchter mit 170 Stück 16-Kerzenlampen. Bei festlieher Beleuchtung treten die drei Balkonreihen mit zueammen 159 10-kerzigen Lampen hinzu. Wenn eammtliche Lampen brennen, so erscheint das Haus in überreichlich hellem, sehönem Lichte. Wie nun aber heutzutage echon die Ansprüche an Beleuchtung überhaupt gestiegen eind, eo dürfte ee eich wohl empfehlen, für gewöhnlich zu dem Kronleuchter noch in der ersten Balkonreihe mindestens je eine 16-Kerzenlampe an jedem Arme anzubringen und zu entzünden. Dadurch würde ohne wesentliche Mehrkosten der untere Theil des Zuschauerraumes mit dem oberen übereinetimmend und ausgiebig erhellt sein, bei festlichen Veranlaseungen aber eine genügend auffällige Zahl von Lampen mehr entzündet werden können.

Die Ankleidezimmer, des Thosterpersonals sind obenfalls mit Glühlungen erkeubete, volle bletzere auf Gelenkarzen aufgesetzt eind. Gänge, Troppen, Garderoben u. deegl. sind mit Wand- und Deckenleuchers versehen, wölche, wie früher bemerkt, von den des Hauptstuftherungen im Mittelbaus und den beiden Seifen gespeich werden. Jede Absweigung von den Hauptleitungen geschicht durch Edico nöche Bleischaltungen, eo dess ein Uberhitzen irgund einer foblerhaften Leitung niemals einstrete kann.

Die Vertheilung der Glühlampen im Theater ist folgende:

10 16 82 korzige Glühlampen

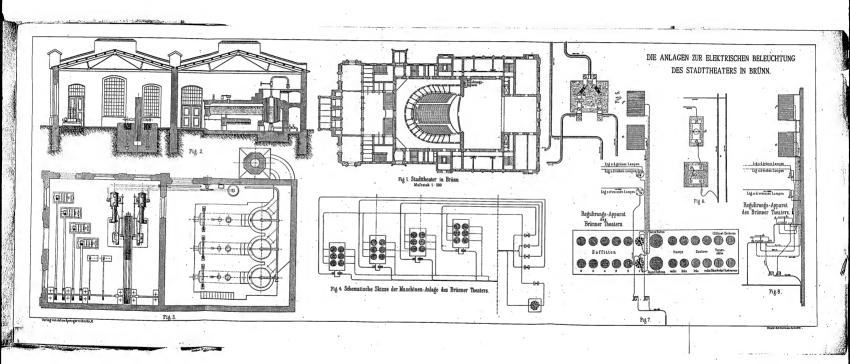
	10		16	32 k	orzigo	Glahla	mţ
Bühne	18		158	156			
Zuschauerraum	159		209				
Treppeu, Corridore,							
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Gardoroben oto.			272				
Ankleidezimmer und							
Balletsaal			57				
Maschineuhaus			15				
Nothbeleuchtung	38						
-	210	,	711	156	in S	Summa	10

Durch die eiganges angeführte Dreicylindermasshine wird eine kleinene Editsonmussekine nud dadurch eine Anzahl von Lampen in ganz getzuntem Stronkroise in Betrich gehalten, welch letztere denrat im ganzen Theater vertheitli sind, dass bei Ausserbetricheutzung der Hauptbelenktung noch kinweichend Licht vorhanden ist, um sich auf Gängen und Treppen zurecht zu finden. Diese Nokhlecushtung (38 Lampen) dient zugleich bei Tage für die Bihmenarbeiten und die Proben

Beim Haupteingauge, bei der Kasses und auf den Haupterspopen sind die verl Hauptevenige der Hausbeimehatung in der Weise angelegt, dass abwechschaft die Beleuchtung immer aus einem anderem Stemkreise entstemmen wirdt, os dass bei atwaigem Versagen einen Hauptetranges immer noch Strom von mitendensen sieher der beiden anderem Leitungsen segendurit, diese Stellen also niemals vollständig in Dankel geratien

Wir wollen obigem Berichte noch hinzufügen, dass die beschriebene Anlage seit dem 16 November v. J. sich in ununterbrochenem Betriebe befindet und allen gehegten Erwartungen in vollstem Masse entsprochen last. Zur Vervoluktandigung nassers Mitheliungan aber die Theasterbelsvoltsungen niege soch erwälnts werden, dass unch im Königl. Höftlie ater in Drosden bereits esit genumer Zeit mater Leitung des Herrn Impektors B. Bisht Verausen unt Edison's Gilbhildstoheslunding gemacht werden. Und zwar kommt hierbot eine Dynanomeselnen, Mödell L., här 195 Sochoulnbaren-Lumpen in Aurwandung, weldes 10 Acht-kerzen-Lampen in Aurwandung. welden 10 Acht-kerzen-Lampen in den Terppen der Zeschauerraums spisit, lotstere sind an Stelle der verhandenen Nothbolouchtung ausgebracht wordt.

Weungleich sich sehen aus den verstelneden Schilderungen die unbestreitbare Branchlarkeit und hebe Wichtigkeit der elektrischen Gihlleithedeuchtung für Theaterzwecke ergiebt, so kann doch als bester Beweis hierfür die Thatsenbe gelten, dess die Kgl. Heftheater-Intendanz in Munchen—nachdem sie sieben Monate lang die Glibhleithedeuchtung im Raddonz-Theater ergrobte — nummehr der Deuts chen Eddison Ges ellsechaft auch die Beleechtung des Kgl. Hefund Nationaltheaters stehtzuen bei





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Zu beziehen durch jede Buchhandlung.

DEUTSCHE EDISON GESELLSCHAFT

FÜR ANGEWANDTE ELEKTRICITÄT

(Volleingezahltes Capital: 5,000,000 Mark)

BERLIN W.

Leipziger Strasse 96.

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Städten, Strassen, öffentlichen und Privatgebäuden, Theatern, Concertsälen, Cafés, Hötels, Krankenhäusern, Fabriken, Bahnhöfen, Bergwerken, submarinen Bauten, Häfen, Werften, Leuchtthärmen, Schiffen u. s. w.

Einrichtung

von Centralstellen zur Lieferung von elektrischem Lieht.

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Compania Electrica de Edison

This folder contains printed material Issued by the Compania Electrica de Edison. This company marketed the Edison system of electric lighting and other inventions in Chile, Peru, and Bollvia under the direction of Edison's agent, Willis N, Stewart. Company offices were located in Valparaiso, Chile.

The following items have been filmed:

- "El Almacenamiento de la Electricidad por Medio de Baterias Secundarias --Opinion de Tomas A. Edison" (1884) "Luz Electrica de Edison" (1885)

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ELECTRICIDAD

POR MEDIO DE

BATERÍAS SECUNDARIAS

Opinion de Tomas A. Edison

Publicacion hocha por la Oficina de la Lus Electrica de Edison en Chile.

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IMPRENTA DE LA LIBRERIA AMERICANA DE CÍRLOS 2.º LATHROP Ahumada 37 A. EL ALMAGE (AMIERTO

ADVERTENCIA

La idea de poder almacenar la electricidad no es nuova, i siempre ha seducido a los profanos i a los hombres do la ciencia.

Bajo el amparo de ella no ha muchos años, en Europa i en los Estados Unidos de Norto América, especuladores do mala lei abusando de la credulidad de grandes capitalistas, han acarreado el desprestijio sobre el alumbrado oléctrico, con el fracaso de empresas que tenian por base la errónea aplicacion industrial de un principio científico que en sí es verda-

La clara i sencilla esplicacion dada por el sonor Edison, a este respecto, i que trascribimos a continuacion, no dudamos que producirá en Chile el mismo efocto quo en Norte América i en Europa: la ruina de esas falaces i engañosas especulaciones.

OPINION DEL SEÑOR EDISON

SOBRE EI

Almacenamiento de la Electricidad.

Tomamos del Boletin X VII de nuestra Compaña la siguionte entrevista con el señor Edison que orijinalmento fué publicada en el "Herala" de Boston. Habió de las baterías de almacenamiento en los términos siguientes:

—"Cuál es su opinion, soñor Edison, dice el "escritor", sobro la utilidad i valor del almacenamiento eléctrico?"

—"Eu mi opinion las baterías para almacenar la electricidad son un engana-bobos, una espocio para producir sensacion, un mecanismo de estafa hecho por companías por acciones."

—"¡Querria usted que repitiese esas ospresio-

nes por la prensa?"

—"Por ciorto que sí, puesto que es la verdad.
El almacenamiento de la electricidad es una de aquellas cosas que seducen la imajinacion; iniguna cosa mas perfecta que tal idea puede haber sido deseada por los estafadores por ac-

ciones. En 1870 mo coupé do la casation, e injonié un sistema para colocar batorias da almacenda on las casas, unidas a conductoras matrices para cargarias durante ol dia desengurlas en la tarde i incehe pirar el sérvicio de lamparas de incandescencia. Obtuve privilejio en cl mismo año (olvido la fechudo da patente); poro en ello no hai mada de positivo. Esperimenté bajo todos aspectes. Mis placas fueron proparadas como las de las baterias de Planté. El método para propararias i cargarias es mas engorroso; pero es mejor quo el de Faure, una vez procavanda.

"Como usted sabel a primera baterá de l'Aure rida de l'aure rida por éte a Sir William Thomson, quien a primera vista quedó maravillado de ella Se le pidió que la patrosimas è constittó i aceptó un honorarie, pero despues de una investigación se convenció de que en el assunto en cuestion no labis nada, i devolió el honorario a la companiá francesa. El hecho es que cuanto mas investigó tanto mas encontró el vacío de teodo el negeció.

"Por medio de le que Labouchére llama una trampa, esta batería secundaria ha sido usada en Inglaterra per compañías de arco voltaico,

Una sola de estas compañías sirviéndose como punto de apoyo de un acumulador i de una lámpara incandescente, copiado de la mia por un tal Lauc-Fox, puso en auje a otras companías subsidiarias enyo capital en conjunto sobrepujo de treinta millones de pesos; i se pagaron per estas compañías inmensas cantidades a la companía primitiva por sus derechos. Pocos meses ha hizo esplosion la bola de jabon; las aceiones que fueron pagadas a 25 pesos se ofrecen por 1 peso, i las compañías estafadoras han sido perseguidas judicialmente por falsificacion en sus prospectos, con relacion al valor del acumulador i al derecho de la lampara incandescente del señor Fox; pues aparece en los procedimientos seguidos ante el juez Chitty que otra compañía tiene el derecho de la lámpara i esta compañía ha cenfesado que era un robo de la lampara de Edison i pagaba derecho (royalty) a la companía de Edison por su empleo. La demanda ante el juez Chitty fué interpuesta por un tenedor de acciones de una compañía subsidiaria, exijiendo la devolucion de su cuota, fundándose en el motivo arriba espresado. Se dió sentencia a su favor.

-"Pero, no se puede acaso almacenar la elec-

—"SI. Cientificamente el asunto éstá bien; pero comercialmente es un fracazo tan absoluto como uno pueda inajianza. Puede usted almacenarla i asegurarla; pero se pierde gradualmento i so escapa con el tiempo. La oficacia de las batarías una vez qua so las ha cargado repetitados.

das voess conitonas a doellnar i su espacidad i oucifia disminuyou despuse do elerto tiempo de uso, requiriendo mayor número do baterías para assaneu ma pron número do baterías para assaneu mayor número de la contra a sustenatoras en a corresion de algorida de la corresión de la coleto de la aceden local i por obras estas del massido numerosas pura específicas; la depresendon anual de la batería no baja de 3 por dento de su coso si se usa dificariamente.

"El hecho es que hai dos o tres compañías que han organizado en los Estados Unidos, de peco tiempo a esta parte, companías subsidiarias de areo voltaico. En este negocio la compañía primitiva ha heelio dinero vendiendo maquinaria, etc., a las compañías industriales; pero éstas no han hecho negocio i casi han cesado de hacer nuevos pedidos. Ahora bien, estas companías primitivas al ver que la demanda de maquinaria aflojaba han entrado en el negocio de las famosas baterias secundarias. Ahora hacen esta esposicion, que es la mayor habilidad que jamas haya yo oido: "caballeres, ustedes tienen una gran inversion en maquinarias para suministrar luz; pero no sacan plata ustedes de todo esto. Bueno, nosotros tenemos algo con lo cual ustedes pneden utilizar su maquinaria. Ustedes pueden trabajar noche i dia, i trabajar mucho mas. Ustedes pueden utilizar sus instalaciones eléctricas actuales durante el dia i asimismo la

electricidad desarrollada en el dia para luz incundoscente, i en la noche ustedes tienen sus instalaciones para luz de arco voltateo directamentes. Esto suema bien i parece bueno i sano no es asti? El consejo de directores discute la. oferta i resuelven que es una gran cosa. Entónes concluyen que dobse natrar en el nogocio.

"Yoi a desir a usted en dónde está el engaño de este plan. Consiste en el hecho de que el costo de las baterías que deben almacenar esta electricidad activa, que dobe jeneravo en el día, seria dos veces mayor que la de la estación que la produce, de manora que, si la compañía ha invertido ya 100,000 pesos, i convieno en utilizar su maquinaria durante el día com la dicion de baterías de almacenaje, encontrará que para llevar adelante su propósito tendrá que invertir 200,000 pesos en baterías. Yo garantizo que no habri un solo consejo directivo entre ciento que se pereibirá de ello; i la compañía primitiva no se lo la nde decir hasta que hayan comprado.

a habor to bien, han comprado las baterias de almacenaje; por supessos al precio de 200 mil pesos. Sobre esta inversion al fin del primor año tienen una depreciación de 30%. Para salvaras tienen que eastigar interesse an en inversion. Tienen tambien que castigar lo bastante para hacer frente a la otra depreciación de su instalación por el tiempo que funciona durante el día, i tendrán que gastar doble entidida de carbon para obtenor la misma produccion de sus batorins;por la razon que éstas se interponen centro el jenemo dro energia i la luz; cesa en la cual lui una pérdida tanto al tiempo de cargar como al descargar; i que hai otra pérdida durante su permanencia, pérdida que anuenta a medida que la batoria envejeco, despues do haber llegado a cierto máximo.

—¡"Cuál es ol máximum de almacenamiento que puede obtenerse con una batería secundaria?

-"Próximamente es de un 50%. Obtiéneso el máximum de corriente cuando se utiliza la total capacidad de la batería, de la misma manera que, en una máquina de vapor, en la cual si se hace que el vaper obre sin espansion, so se pierde un 50% del vapor, aunquo así se obtenga el máximun de su enerjía; pero este es tambien el minimun de economia. Por lo tanto, para proceder economicamente, los constructores de motores de vapor solo procuran aprovechar un tercio o un cuarto de la máxima enerjia de ellos; porque, aunque así se haco mas costosa la construccion de las máquinas, no obstante la economía que se obtiene trabajando con espansion compensa los mayores capitales invertidos en ellas.

Cuando dicen que obtienen un 90% de la batería, dicen algo que cientificamento es verdadero. Así, ellos aseguran que cada caballo

de energia de corriente de una bateria alimenta diez luces de 16 velas cada una, Ahora bien, eso es cierto i no es cierto. Con un caballo de corriente eléctrica obtenido por medio de una batería deben obtenerse 10 luccs de 16 velas; pero para conseguirlo forzoso es impedir todas las pérdidas que se efectúan a traves do la batería, a traves de los conductores, a traves del dynamo i otras. Se parte con el poder de un caballo quo indica el motor. Cierta cantidad de ésto se pierde para moyer la maquinaria i el dynamo i todavía cierta otra cantidad se pierdo on ol dynamo para convertir fuerza en electricidad; i esto porque ninguna máquina es perfecta; ademas, cierta cantidad debe perderse en el conductor quo reune la estacion con la batería secundaria; aun otra cantidad se pierdo en cargar la batería, por cansa de su resistencia e imperfeccion do mecanismo; aun otra cantidad se desperdicia en el intervalo entro la carga i su uso; todavía otra parto tione quo perderse al doscargar la batería para el servicio do las lámparas, i como sino fuera bastante, otra parte se perderá en el alambre que conecta la batería a la lámpara. Así que, aquel caballo do fuerza, tiene que desvanecerse hasta que solo suministre ol servicio do tres lámparas proximamente; miéntras que si se trabajase directamente se obtendria probablemente hasta sois lámparas.

carbon para obtener la misma produccion de sus hatorias;por la ruson que éstas se interponen entre ol jeuendor de energia i la luz; cesa en la cual luti una pérdida tanto al tiempo de cargar cemo al descargar, i que lani otra pérdida dumnte su permanencia, pérdida que anmonta en a medida que la batería envejece, despues do haber legado a cietto máximo.

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de enerita de corriente de una bateria alimenta diez luces de 16 velas cada una. Aliora bien, eso es cierto i no es cierto. Con un caballo de corriento eléctrica obtenido por medio de una batería deben obtenerse 10 luces de 16 velas; pero para conseguirlo forzoso es impedir todas las pérdidas que se efectúan a traves de la batería, a traves de los conductores, a traves del dynamo i otras. Se parte con el poder de un caballo que indica el motor. Cierta cantidad de éste se pierde para mover la maquinaria i el dynamo i todavía cierta otra cantidad se pierde en el dynamo para convertir fuerza en electricidad; i esto porque ninguna máquina es perfecta; ademas, cierta cantidad debe perderse en el conductor que reune la estacion cen la batería secundaria; aun otra cantidad se pierde en cargar la batería, por cansa de sa resistencia e imperfeccion de mecanismo; aun otra cantidad so desperdicia en el intervalo entre la carga i su uso; todavía otra parte tiene que perderse al descargar la batería para el servicio de las lámparas, i como sino fuera bastante, otra parte se perderá en el alambre que cenceta la batería a la lámpara. Así que, aquel caballo de fuerza, tiene que desvanecerse hasta que solo suministre el servicio de tres lámparas proximamente; miéntras que si se trabajase directamente se obtendria probablemente basta seis lamparas.

-"Ud les pega fuerte a los partidarios de

-"La razon por la cual soi duro con esta iente es porque vo tengo una cosa lciítima, i a causa de las operaciones de estos señores hai una pérdida de la confianza pública. Nunca hasta el presente hemos pedido sus dineros al público. Aliora bien, yo no quiero que se abuse de él, por cuanto deseo que nuestra Compañía haga su negocio de luz eléctrica de una manera lejitima, dando un valor cierto por lo que la Compañía recibe: i si ésta vende dereches pruebe a los compradores su valor por medio de resultados ebtenidos en la práctica en una ámplia escala comercial, tal cual hacemos a la feclia; de modo que el poner en evidencia estas eosas ha de hacer mas fácil i mejor el éxito de mi sistema i el reconocimiento de sus

"El mismo cugato que se pretende perpretaren los Extatos Unidos ha sido plantcado en Ingiatorra, i en último resultado el público ha perdido toda confianza en la luz eléctrica. Esta misma jonte se enceuntra establecida aquí. Presentan lo que llaman la lámpara de Swan quees una evidente violacion del derecho de la mila-Los hemos demandado en Ingiaterra i los demandaremos en este país. Pero, está pinte sabe, perfectamente que se necesita algun tiempo para resolver una demanda i durante sest teinpo ellos habran permitido al público invertir fuertes sumas."

—¿Entónces considera Ud. que las baterías de almacenaje son del todo impracticables? ¿No habra esperanza de que puedan realizar un lejítimo trabajo?

-"No hai esperanza alguna. Esceptuado un número de casos mui limitados, puede considerarse el almacenamiento de la electricidad como enteramente análogo al almacenamiento del gas. Uno de los principales gastos de instalacion de una compañía de gas es el de la cañeria. El diámetre medio de sus cañones matrices es de 5 a 6 pulgadas. Pero, si se precediese baje el principie de tener en cada casa un pequeño gasómetro se podrian servir de una cañeria de una pulgada bajo presion maver que la que actualmente emplean para forzar el gas a traves de los cañones matrices. La diferencia que economizaria la compañía de gas con este arreglo seria de 15 pesos próximamente de casa á casa, distantes 25 a 30 piés. Pero. el gasómetro de cada casa costaria mucho mas que los 25 piés de cañon matriz que quedan enterrados en la calle. Por otra parte, les gasómetros no serian quizás lo mas conveniente en manos del público; podria haber esplosiones, algunos no tendrian lugar para colocarlos, el gasometro requeriria cierto mecanismo i manipulacion para reducir la presion al límite que se necesita; mecanismos que tienen un uso incierto.

"El conocimiento del público al tratarse de "mecanismos" es ademas i jeneralmente incierto; i probablemente, estas causas han impedido a los injenieros de gas el introducir un sistema de almacenamiento local.

"La compañía eléctrica de arco voltaico que trate de introducir un sistema de almaccaajo se propone realizar exactamente la idea arriba espresada. En vez de emplear auchos conductores i electricidad a baja presion, como lo hago yo, intentan cconemizar en el capital de instalacion usande delgados conductores i electricidad a alta presion; i para hacer que esta electricidad sea utilizable reducen su presion mediante una batería de almacenaje, de la misma manera que el gas a alta presion puede ser almacenado en un gasómetro. Su presion redúcenla hasta hacerla utilizable. Resulta en primer lugar que la corriente de alta presion es mui peligrosa para las vidas. La despreciacion de las baterías de almacenaje, en un sistema de distribucion ieneral, per si sola pagará el interes sobre la mayor cantidad de cobre que se requiere para prescindir del uso de aquellas. Ademas, si estos pequeños conductores de corrientes de alta presion fueran celocados baje tierra, como deben hacerlo todos los sistemas, para ser industrialmente duraderos en las grandes ciuda-

des, resultaria que el mayor costo, proviniente del aislamiento necesario para impedir la filtracion o escape a tan alta presion, deberia pagar con exceso la mayor cantidad de cobre que se destina en un sistema que emplea corrientes de baja presion, i que no requieren un aislamiento ni tan grando ni tan costoso. El yalor de nuestros conductores matrices eléctricos es de 15 pesos mas o ménos de casa a casa. Estos conductores están colocados dos piés bajo el suelo, donde la parte intelijente del público no puede alcanzarlos bajo el pretesto de mejorarlos: miéntras que con baterías de almacenamiento deben invertirse de 75 a 200 pesos en baterías, en cada casa, con el propósito de realizar una economía de 9 pesos de cobre, i para interponer una invencion incierta en que con seguridad tiene que perderse el 50% del precio de costo.

—"Aqui el señor Edison se detuvo un momento, se quedó pensando, i alzando de repente la cabeza dijo con su especial manera, "tan pronto como un individuo se pone a trabajar en el negocio de baterias secundarias, al punto surjo en di su capacidad latente para mentir."

—"Pero, supengamos que tuvieramos un motor barato tal como el agua ino sería económico almacenar la electricidad aun a trueque de gran pérdida de fuerza?

-"Haciendo uso del agua como fuerza mo-

triz, aunque el cesto del agua fuera casi nuda, todavia habria que censiderar el costo de la instalación para nalmacemar la eloctricidad, a lo cual debería agregarses los intercesos i la depreciación. Diónde cetá la coenomía entre descencion. Diónde cetá la coenomía entences, canado ca la mayor parte de los casos con solo unir el namo directamente a la turbina se puede obicalmente de la mismo resultado i mucho mas barato? Pero e en eccarario tambien tener presente que los motores de agua ao sen tan conómicos como as crue. Rara vez les que so sirrea de ellos disponen de un excedente do agua daranto todo ol ano para utilizar en caste sentido.

"Los individuos que hablan del ahnacenamiente de la electricidad dicen que las himparas arden mejor, alimentadas por una batería que por un dyname. Ne es así. Las lámparas se mautienen mui brillantes al empezar; pero si de tiempo en tiempe no se las alimenta con nuevas baterías, su peder luminose decrece rápidamente. Si se tiene una bateria que pueda alimentar diez luces, i se desea mantenerlas on actividad hasta las 10 de la noche per ejemplo, será necesario disponer de otras baterías para reforzarla; de otra manera las lámparas disminuirán en peder luminose ántes de que espire su tiempo indicade. I, entónces despues do apagar las luces, las baterías perderán próximamente un quinte de su carga remanente, ántes de que so las vuelva a cargar.

"Hai en esto una lei natural en contradición con las baterías de almacenamiente, i consiste en que, cuande ol plomo está mui dividido descompone el agua. Es sabido que cnando sir Williams Themsen notó este fenómeno sacó de una batería una verdadera esponia metálica. Todos los motales so n un verdadero combustible i cuando se oxidan se trasferman en cenizas; i la operacion de volverle su ferma metálica primitiva despues de haber pasado por esta trasformacion requiere el gaste de una energía considerable. El señor Brush puede decir que tiene un miste secreto. La verdad del case es que se sirve de una sal de pleme. Emplean plomo i sus baterías no son sinó baterías de Faure lisa i llanamente. Los constructores de las baterías Brush dicen que necesitan seis meses para fabricarlas. Hai facterías en Nueva Yerk que pedrian suministrar en sole tres semanas 6,000 elementes de ese sistema! La primitiva companía de Brush, es una aseciacion respetable i con responsabilidad; pere la compañía de almacenamiente de electricidad Brush i Swan tiene todes les vises de ser una cerperacien quo busca a escudar sus cugañes bajo el natrecinio de la primitiva compañía Brush."

—"En este momento el señer Edison tomó un diario i leyó algunos estractes de un artículo referente a la companía de luz eléctrica de Brush i Swan. Comentándolo difo, ontre otras tosas: "Creo quo existo una sociedad para impedir la crueldad para con los animales, i otra para impedir la ceneldad para con los ninos. Actualmente deberian fundar otra para impodir que las jentes se engañasen a si mismos.

El hecho de recibir dinero por tales artículos (refiriéndose al quo leiu) debia sor considerado como una ofousa a la lei; porque si esto no es obtener dinero con falsos pretestos yo no sé lo quo es."

"Volvamos a las baterias do almacenamiento i comparomos su costo i los resultados con los de un sistema directo. Conformo a los recientes esperimentos efectuados en Paris por el señor Tresea en el Conservatorio do Artes i Oficios, con una batería do Faure, so ha encontrado on las mejores condiciones, que dicha batería solo produce el cincuenta por ciento de la enerjia del dynamo i el enaronta i cinco por ciento de la del motor. Esta batería que alimentaba oneo lámparas duranto oneo horas, tenia un peso do 2,310 libras. Ciento noventa libras do batería corresponden pues a diez lámparas por hora. Si esta batería se puede vender a 35 centavos libra, el costo por batería correspondiento a diez lámpuras por hora sorá \$ 66,50 centavos o \$ 6,65 centavos para una lámpara por hora. Para 250, luees por una hora, el costo de bateria es por lo tanto do \$ 1662 50 centavos i para seis horas \$ 9,975. Por consiguiento, una

batoria quo puede alimentar 250 lámparas durante seis horas importa \$ 9,975." "Depreciacion, 25%...... \$ 2493 75

Intereses, 8 %

Como, segnn los resultados, so obtiene diez lámparas por cada caballo motor en las baterías secundarias, desarrollarán 25 caballos; pero, como solo el 50 por ejento de la enerjia desarrollada por el motor es devuelta por la batería, so necesitaron para cargarla evidentemente 37,5 caballos durante las 8 horas. El motor habrá dosarrollado 350 caballos a razon do 4 libras de earbon por eada caballo. Un total de 1,200 libras por dia, o do 180 toneladas annalmente, contando 300 dias, a 4 pesos 50 centavos por tonelada liacen.....

Por intereses i depreciacion, sobre \$ 3,000, costo dol dynamo em-

810 00 300 00

pleado en eargar las baterias..... Gasto total por año sin contar ol valor del dynamo i de las batorias...... 8 4401 75

He aquí ol costo annal para alimentar 250 lámparas 6 horas por dia durante 300 dias por medio de baterías. Es necesario observar que en esta cuenta solo se han cargado los intereses, depreciacion de la instalación i costo del combustible.

"Comparemos ahora el mismo servicio practicado con un sistema directo do olectricidad, e incluyendo al costo del dynamo, i veamos quo resultado so obtieno:

Costo del dynamo...... \$ 3000 00 Intereses i depreciacion 10 %.... 300 00

Interesas i depresiacion 10 **,...
Esto dynamo allimentando lámparas directamente requeriri 35
caballos, i para 6 heras un total
de 210 caballos. Aceptande come
en el case anterier que enda enballo necesite el illuras de carbon,
bello necesite el illuras de carbon,
resultará un censumo diario de 640
libras, o sama 25,000 libras en 300
dias, o 120 toneladas anuales, que
a 4 pesos 50 centavos per toueladas lacen.

567 00

contra \$ 3,000 quo importaria nuestro sistema directo. iHe consegnido esplicar a Ud. claramente el problema?

"Esos son los individuos que proclaman on pomposas eirenlares que pueden iluminar molinos i otros establecimientos industriales con solo instalar en ellos un pequoño dynamo que funeione oeho horas, i almacenando su electricidad desarrollada, evitando de esta manera el costo de una dispendiosa instalacion que alimentase directamente las luces. Prebablemente esos individuos objetarán que yo ponge mui subido precio a las baterías: consentirán para prebarlo en vender esas baterias por mucho ménes; i no seria rare que hicieran lo que en Inglaterra se hizo eon la lámpara de Lane-Fox, que era vendida a las cempañías subsidiarias en grandes cantidades a razen de 5 chelines, miéntras que su costo de fabricacion era de 12 chelines!"

de baterías. Es necesario obsorvar que en esta cuenta solo se han cargado los intereses, depreciacion de la instalacion i costo del combusti-

"Comparemes altera el mismo servicio practicado con un sistema directo de electricidad, e incluyendo el costo del dynamo, i veamos quo resultado se obtiene:

Costo del dynamo...... *\$ 3000 00 Intereses i depreciacion 10 %... 800 00 Este dynamo alimentando lámparas directamente requerirá 35 caballos, i para 6 heras un total de 210 caballos. Aceptando como en el caso anterier que cada enballo necesite 4 libras de earbon, resultará un consumo diario de 840 libras, o scan 252,000 libras en 300 dias, o 126 toneladas anuales, que a 4 pesos 50 centavos por toucladas haeen.....

567 00

Gasto anual total \$ 867, c, incluyendo el costo del dynamo no se o \$ 534 75 ménos que el simple costo de haccr el mismo servicio con el sistema de baterías. Si se toma en consideracion el valor del dynamo, i de la batería en el caso del sistema indirecto, se llega a la suma de \$ 12,975 para la instalacion,

contra \$ 3,000 que importaria nuestro sistema directo. iHe conseguido esplicar a Ud. claramente el problema?

"Esos son los individuos que proclaman en pomposas circulares que pueden iluminar molinos i otros establecimientos industriales con solo instalar en ellos un pequeño dynamo que funcione ocho horas, i almacenando su electricidad desarrollada, evitando de esta manera ol costo de una dispendiosa instalacion que alimentase directamente las luces. Probablemento esos individuos objetarán que yo pongo mui subido precio a las baterías; consentirán para probarlo en vender esas baterías per mucho ménos; i no seria raro que hicieran lo que en Inglaterra se hizo con la lámpara de Lane-Fox, quo cra vendida a las compañías subsidiarias en grandes cantidades a razon de 5 chelines, miéntras quo su costo de fabricacion era do 12 chelines!"

Agregamos a la opinion del señor Edison, que por algunos se podrá considerar parcial en este caso, la del eminente electricista Gordon, poco entusiasta, como buen ingles, de lo que se hace en la novel América (1). PAJ. 189. CAPÍTULO XVI. EL ALMACENA-MIENTO DE LA ELECTRICIDAD.—BATERÍAS SECUN-DARIAS. "Los resultados obtenidos en el almacenamiento de los gases en gasómetros, ad-hoc han sujerido a muchos inventores la idea de poder almacenar la electricidad, o mas bien, la enerjía eléctrica de una manora semejante. "La única manera bajo la cual podria ser almacenada la electricidad directamente, seria al Treatise on Electric Lighting by J. E. H. K. S. T. E. nialando dos conductores i cargindolos respectivamente positiva i negativamento. Poniéndolos en seguida en coneccion, por medio de un alambre conductor, es ovidente que se establecería una corriente al traves de dicho alambre, corriente que d'uraria hasta que las presiones se ignalaran. Para aprovechar la corriente en la iluminacion, no habria sinó intercalar en el circuito una l'ampara.

"Por supuesto quo el método cs impracticable a causa de la dimension enorme quo debcrian tener los conductores, para que pudieran almacenar una carga que pudiose ser apreciable

aunque por cortísimo tiempo.

"Los dos conductores deberian estar dispuestos como los de un condensador o botella de Leyde; forma bajo la cual se puede almacenar mayor cantidad de electricidad, pero no tal que pueda prestarse a nsos prácticos.

"Viéndose, por lo tanto, que el almaceuamico de la corriente eléctrica es impracticable, las investigaciones se encaminarou hicado tros métodos de almacenamiento de una onerjía potencial, bajo una forma que permitiera convertirla en enerjía eléctrica en el momento

"Esta enerjía potencial podria ser jenerada de distintas maneras, i la enerjía gastada para producirla podria ser o una enerjía eléctrica o una enerjía de cualquiera otra especie. "Por ejemplo, le energía potencial que se tratara de alimenear para aprovecharla hejo la forma de nonejía eldetrica, podrán ser la energía química latente en el zinc i en el ácido de una bactra voltalea cordinaria; o podrán ser la enerjía mecánica i química respectivamente del vapor listo hajo presión en un caldero i del carbon listo para ser arrojado dentro de la hornillo.

"Sis equisiers producir una energia potencial para almacenañ, por medio de una energia oléctrica, podrámos emplear una corriento eléctrica, que acicunado sobre un motor- hietera que aciste comprimiera nire o elovase agua hasta iorta altur a; de tal manera que el aire o el agua pudieran a su vez obrar sobre un dynamo; o bina so podrán emplear la corriente en producir una carga química en una batería secundaria.

BATERÍAS SECUNDARIAS.

"El señor Planté ha en contrado que si se colocan dos hojas de plomo convenientemente preparadas en una disolucion de ácido sulfárico dilitido i se canectan respectivamente con los dos polos de undynano, se produce un efecto químico en llas tad que se comportan a su vez como una batería voltaica, produciendo una cantidad de esertia eléctrica que vieno a ser una considerable fraccion de la corriente total del dynamo que se empleó para cargarlas.

"Siendo engorreso el método empleado para preparar el plemo, el sonor Tamou inventó uma batería compuesta do simples planchas do plomo cubiertas de minio o óxido (rojo de plomo. Esto invento produjo en 1880 gran exitacion co lugitarora a cuasa de un seuteto que pudo lesese en el Tinus, en el cual se animiciaba que so labía llevedo de Paris a Lóndres, en una pequeña maletita, 1,000,000 de pit-fibras de enenjía aldetria.

"Et tal millon parceo ser una enorme cantidad; pero para formarnos una idea casata do sa ungnitud, debemos lacer notar que su equivalente en unidades comerciales, i al precio máxilente en unidades comerciales, i al precio máxino autorizado per la Cimara de comercio del distritode Sau James, vale "two-pence half penny" (poco mas de cinco centavos.)

"En catos últimos tiempos se han patentado un En menes mimero de modificaciones en las haterías secundarias; pero hasta ahora no hemos pedido ver una sola batería secundaria que funcione con mediano éxito. Aun recientamenta cargadas, no devuclven un 75% de la encrifa que se empledo para cargarias.

"En segundo lugar, estas baterías no conservan su carga. He podido observar que si se carga una batería i se guarda durante una semana, su rendimiento disminuye considerablo-

mente. Estas pérdidas se deben a acciones químicas locales, que tienen lugar en el interior de las baterías.

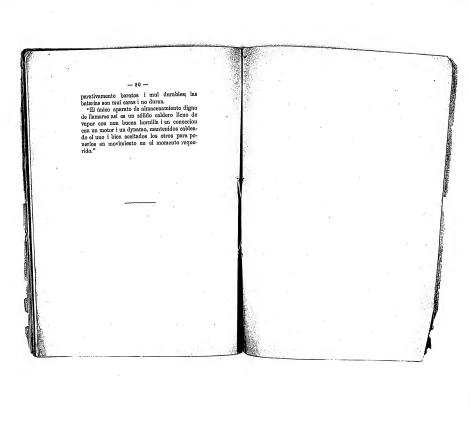
"En tercer lugar, las baterías secundarias se destruyen rápidamente siendo necesario renovar el plomo al cabe de pocos meses.

"En cuarto lugar, el costo primero de instalacion por cada unidad de enerjía eléctrica que pueden almacenar (bajo la forma de enerjía química) es mui subido.

No lai duda que los intereses i depresiacion on ma instalacion de baterias secundarias con poder saficiente para producir una iluminacion oldetrica, son con mucho mas subidos que los intereses i dopreciacion correspondientes a una doble instalacion de motores, calderos i dynamos.

"Conato mas estudiemes la cuestion del almacenamiento de la enerjía eléctrien, tanto mas nos convenceremos de que la mejor forma de enerjía potencial almacenada está en la enerjía potencial del carbon de piedra i vapor comprimido; i que el mejor aparato para efectuar el dielto almacenajo es un buen culciro listo para actuar sebre un motor i un dina-

"La enerjía potencial contenida en una batería, rapidamente desaparece. Con los calderos no sucede lo mismo. Les motores sen com-



COMPAÑIA ELÉCTRICA DE EDISON

AJENCIA JENERAL PARA

CHILE, PERU Y BOLIVIA

108-CALLE COCHRANE-106

VALPARAISO

Luz Eléctrica de Edison

SISTEMA CANDENTE

PRIVILEJIADO POR EL SUPREMO GOBIERNO DE CHILE

VALPARAISO

IMPRENTA EXCELSIOR

Luz Eléctrica de Edison

SISTEMA CANDENTE

PRIVILEJIADO POR EL SUPREMO GOBIERNO DE CHILE.

El sistema Edison de alumbrudo eléctrico por candoncia es tau bien conocido en esta costa, que canjuiera descripcion serás superdia. La esperiencia de todos los que lan usado esta luz es, que no solamente es la mas Segura, la unas Hermose, la muno Clera y Para laz que existe, sino tambien la mas Barata.

Maquinas, Dinamo-Electricas, del sistema Edison, son fabricadas en los siguientes tamaños:

40 de 10 velas. 50 ,, 16 80 ,, 10 200 ,, 10 275 ,, 10 ,, 16 150 ,, 16 200 ,, 16 350 ,, 10 300 ,, 16 ,, 500 ,, 10 ,, 800 ,, 10 400 ,, 16 1200 ,, 16 ,, 2000 ,, 10

Como tambien, máquims dinamos combinadas de lento andar y máquimas verticules a vapor para el alumbrado de buques. Estas máquimas son mui efi-

caccs y ocupun mui poco espacio.

Todos estos dinanos dan una corrioste de baja
tencion o fuerza electronucitz, con perfecta seguridad para las vidas y propiedades.

Las máquinas, alambres o efectos pueden ser tomados con la mano desunda siu riesgo ninguno.

Las máquinas, alambres o efectos pueden ser tomados con la mano desunda siu riesgo minguno. Tambien estún provistos con reguladores automáticos, por lo cual la cantidad de cerriento suministrada es siempre lo justamente necesario para que las lámparas sean consumidas a la fuerza normal de la

vela. Estas miquinas son especialmente adoptadas para alunibra casas particulares. haciendas, molinos, fábricas, buques, edificios públicos, cerecerias, destiladeras, minas, etc.

EL SISTEMA DE APOSTADERO CENTRAL DE EDISON.

Por este sistema una corriente de electricidad fija y continua os sunfinistrado a toda las casas. casas de negocios o fábricas de un pueblo o ciudad, cuya corriente puede ser utilizada en la produccion de Luz, Calor, o Fuerza Motriz. Mas do traina de las Entaciones Contrultes de Elison están ustimiente funcionando en varias partes del mundo, y mucius lui en construccion. Esta Compalía esté lista para instalar tutes Estaciones en Child. Perd y Bolivia, suministrundo y montando tod o material. Doste lui fucciona de construcción con la compania de la compania del la compania de la compania del la compania de la compania de la compania del la compa

ELECTROLABRAS y todos los útiles para la luz de Edison de todos clases.

Lamparus de 32, 50 y 100 velas eada una pueden ser usados al mismo tiempo que los de 10 o 16 velas

en lugares donde se dosen una luz concentrada. Presupuestos para toda clause de trabajo sería dado con placer a los que lo soliciten. Es necesario dar riempre la mínuero y le clause de luces que se necesatan, y para qué uso, un diseño del local que se va alumbrar, con les dimensiones y alturna del techo, por la companione de la companione de la companione por la companione de la companione de la companione por la companione de la companione de la companione por la companione de la companione de la companione por la companione de la companione por la companione de la companione por la companione de la co

INSTALACIONES DE EDISON EN CHILE.

Nota.-El sistema de Edison de alumbrar por la candencia de un filamento de carbono encerrado dentro de un globo de cristal privado del airo, es dentro de un globo de cristal privado dei aire, es protojido por privilejio esclusivo concodido por Su-premo Gobierno de Chile. La produccion, regulacion, y distribucion de corrientes eléctricas para el suninistrar luz, calor o fuerza es tambien protejido por privilejio. Compradores o consumidores de estas lámparas o aparatos que infrinjau estos derechos son respetnosamente notificados de que serán personalmente responsables.

- 7 -LAMPARA DE ARCO, SISTEMA EDISON.

Estamos proparados para suministrar maquinas y ensores para el alumbrado de arco, donde el se pue-da necesitar. Maquinas desde 2 a 20 lámparas cada una, de 1200 o 2000 volas de fuerza. Estas lámparas son adaptadas para alumbrar calles, plazas, o cualquier local grando y descubierto. Estas máquinas son voudidas a precios nuncho mas bajo que lo pedido por otros fabricantes. Mandad por pormenores y presupuestos, daudo todos los pormenores, como arriba indicado.

TRASMISION DE FUERZA MOTRIZ POR ELECTRICIDAD.

Los mismos dinamos usado para la produccion de luces de arco o candentes paeden ser usados para la trasmision de fuerza motriz por medio de la electri-cidad. Esto se linco colocando en cualquiera parte del alambre que viene del dinamo un motor eléctrico de la fuerza que sen requerido. Estos motores pueden usarse separadamente o en conexion de un circuito alumbrador, cosa que así el mismo dinamo puede trasmitir fuerza motriz y producir luz. Estamos pre-parados para suministrar motores de Edison o los de de los siguientes tamaños: 1/10, ‡, 1. 1½, 3 y 4 caballos. Tamaños mayores estarán listos mui lnego. Estos motores son empleados pura funcionar ventiladores, hombas, barrenos y toda clase de maquinaria, Posen las siguientes ventajas sobre todas otras

proviamento construidas:
1.º Pueden principiar a funcionar con lentitud,
con o sia carga, y sin sultar.

2. Funcionan con escobillones en una posicion fija, y siu chispeur o gasto sobre el comutador. 3. Funcionan con solamente una variacion de dos por ejento en el andar siéadole indiferente el peso de

su carga.

4. Son tan perfectamente automáticos en su acción y tan sencillos que un niño puede hacerlos fun-

Al offreer estos motores, por la cual la fuerza de los alambres puede ser trasmitido tan económicamenrie por largas distancias, la Compañía cree que uniguna invencion moderna ofrece mas garantias al porvenir iadastrial de las Repúblicas de la costa Occi-

venir iadustriul de lus Repúblicus de la costa Occidental.

Precios y todo pormenor será suministrado con placer. Se solicita correspondencia.

FERRO-CARRILES ELECTRICOS.

El gran triunto obtenido por los ferro-carriles eléctrices en Berlin, Gimba Causewy, on Irlanda, Bréglation, Inglaterra, Cleveland en Estados Unidos, y on la quinta de Mr. Edito en da Menle Park, las estados un composito de la composito d

CALDERAS Y MAQUINAS A VAPOR.

El estensivo uso de la luz eléctrica ha traido a la existencia varios nuevos tipos de míquinas a vapor de lijero andar, tantos libosociale como verticales. Estamos proparados para suministrar estas méquinas para todo empleos y a precios infimos garantizando una absoluto regularidad en el andar y movimiento, gran economía de vapor, sencillez y solidez en su construcción.

El tubo de agua y cul·leros a vapor inexplosible del sistema Babcock y Wilcox está dejando una atrías a todo los denas on todas partes del nundo. Son haratos a primer costo, consumen menos combestible, absolutamente seguro, y de la mas aprobada construccion. Nosotros suministramos estos endetes de cualquier tamaño que so deisco.

TELEFONO ACUSTICOS

Los teléfonos seústicos de la Compañia Consolidado de Teléfonos son mai superiores a los instrumentos eléctricos para distuncias cortas, media legua o ménos. Los instrumentos son lajosamento hechos, y estan previstos de campanillas eléctricas e magné-

Estos instrumentos no tienen rival para comunicurse entre las varias partes de una fábrica o molino, o de las laciendas a las casas esteriores, etc.; comple-

tamente garantidas.

Precio: 2 instrumentos \$ 150; alambre especial, 10 centavos metro. No hai contribucion.

- 11 -

MOTORES DE GAS.

Los célebro motores de Gas, "Otto" son mui usados para mover los dinamos para la produccion de luz eléctrica y fuerza motiriz. Como el gus produce mas calor que luz, es mas económico usar luz eléctrica producida por un motor de gas, que usar el gas para alumbrado.

Los motores de Gas no necesitan ningun hombre competente para manejarlos, y en ciudades grandes su uso se está haciendo uni comun.

Nosotros suministramos motores de gas, sistema "Otto" hasta 30 enballos de fuerza, y tenemos discños especiales adaptables para el alumbrado eléctrico,

LAMPARAS ELECTRICAS DE EDISON, EN MINIATURA.

Lámparas chiens de Edison, se laseen abora de los signientes tamaños: \$2, 1, 2, 3, 4, 9 % velas de poder cuda uno, y en diseños especiales para dentistas y cirujanos. Baterias y productos quínicos tambien se diseana. Fraededores para corbatas, incluyando of diseana. Fraededores para corbatas, incluyando of diseana. Fraededores para corbatas, incluyando of diseana. Praededores para corbatas, incluyando of compais y compais de la comp

Este hermoso y perfeccionade instrumento es ahora fabricado de modo que tedo los tonos e inflecciones de la voz lumana, música, etc., puedan ser co-rectamente reproducidos en cualquier tiempe. Precio: \$ 350 con un surtido de hoja de estañe.

MISCELANEA

Estames preparado para suministrar a les mas ba-jos precies el siguiente material: Alambro de fierro y esbra para tode use eléctrico; Alsiadores de cualquier diseño; Campanillas eléctricas, anunciadores y materiales

Campanillas electricas, anunciadores y materiales paru les misunes; Alambre nislado para tode trabajo eléctrico contra fuego y contra ugua. Baterias o Pilas. Eléctricas de Berguann Gulvanie Batteries, superier a los de Le-

clanché y mucho mas barates;

· Instrumentos Telegráfices; Hermmentas e instrumentes usades en trabajos Eléctricos;

Libros y publicaciones sobre electricidad; Aparatos para señales on forre-carriles.

Tonemos en nuestro empleo un enerpo de injenteros y empleados que ban tenido mucha esperiencia

en trabajos eléctricos en esta costa: este solo hecho asegura el pronto y satisfactorio cumplimiento do todo trabajo encomendado a nuestro cuidado. Se solicita correspondencia. Precio por cualquiera de los materiales arriba indicado serán dado a los consecuencias de las consecuencias en consecu que le seliciten de la

COMPAÑIA ELECTRICA DE EDISON.

106-Calle Cochrane-106

Valparaiso.

Edison Phonoplex System

This folder contains printed material relating to Edison's phonoplex system. This system of railway telegraphy devised by Edison in the 1830s combined features of the telegraph and telephone. Related material can be found in D-85-096 and D-86-099 (Document Pile Series) and in Phonoplex Letterbooks, LM-012 and LM-013 (Letterbook Series).

The following item has been filmed: "Edison Phonoplex System of Telegraphy" (ca. 1886).



SAMUEL INSULL, Manager.

A. O. TATE, Electrician.

EDISON

PHONOPLEX SYSTEM OF TELEGRAPHY.

ECONOMY.

Saves the cost of erection of new lines.

SAFETY.

Phonoplex circuits cannot be left open.

ADAPTABILITY.

Circuits may be arranged to suit almost every requirement and combinations formed which cannot be effected by means of any other known system of Telegraphy.

SIMPLICITY.

The Instruments are easily controlled by ordinary operators.

PRACTICABILITY.

We send with this issue of the Phonoplex Pamphlet copies of letters we have received from a few of our licensees, which show that all our claims for the System have been fully proved by practical experience.

Address all correspondence to

EDISON PHONOPLEX SYSTEM OF TELEGRAPHY.

....

Orange n. J.

THE EDISON

PHONOPLEX SYSTEM OF TELEGRAPHY

meets a requirement that has long been manifest in tolegraphic circles. The ordinary duplexing of a wire, which increases facilities between terminal points only, has been largely applied, but until Mr. Thomas A. Edison devised this new method of transmission no means were available by which the capacity of intermediate offices on a single Morse circult could be increased. Through the use of the Phonoplex system oxtra circuits are provided, by means of which more than double the amount of service may be derived from a single wire than is at present obtained, while its extreme simplicity of detail and adjustment places it within the easy control of ordinary operators.

PRINCIPLE.

The principle upon which the system is operated is induction. The instruments employed for signalling respond only to induced currents thrown upon the line by transmitting devices, which currents interfere in no way with Morse instruments in the same circuit, being made to pass around then through condensors, while Morse waves in turn have no perceptible effect upon the Phonoplex apparatus; thus, two or more independent circuits may be provided on a single wire, as will be more fully explained hereafter.

LENGTH AND ARRANGEMENT OF CIRCUITS.

This system of telegraphy can be operated upon circuits not reading one hundred miles, or thereabouts.

All or any desired number of intermediate offices may be doubled in their capacity, or communication can be established

"We have in some cases been able to work the phone-"plex when the line was interrupted so as to be useless
"on the Merse side." J. W. LATTIC, Supt. Tolograph,

Lohigh Valley R. R. Co.

between terminal points only, regardless of whether such points are intermediate offices on a Morse wire, or Morse terminal estations. In short, between such offices as are equipped with the Phonoplex, an extra circuit is provided, the same as though an additional wire had been strume.

RAILWAY LINES.

.The delays which are attendant upon the transmission of business over railway wires, on account of the more important work of train dispatching, may he avoided by providing Phononlex circuits as outlets to rolleve the Morse line.

On roads which employ only one wire, another great advantage that will be more fully explained later on, lies in the fact that Phonoplex circuits can never be left open, neither through their own instruments nor these of the Morsevine. The opening of a Morse key in the same circuit has no effect upon the phonoplex system, the inter remains interest so long one that the opposite system, the inter remains interest as long and offitness serious interruption of the readway itself is provided excinate by this greteen.

COMMERCIAL WAY WIRES.

The Phonoplex System is especially adapted to the requirements of way wires, the conditions on which, regarding delay through overerowding and the opening of keys, heing identical with those mentioned in connection with railway lines.

Many of these wiree am etrung between a number of important points, tapplug in their course offices of loss importance, and the Phonopher, which permite the inclusion or exclusion of any or all intermediate stations, may be operated either wholly or partially as a through circuit, with the object of relieving the pressure at certain points only, or, where necessary, doubling the capacity of the whole line.

THROUGH WIRES.

On wires exceeding one hundred miles in length, phonoplex circuits may be added, the first starting at the initial office and doubling the especiely to a distance of one hundred siles beyond, shoulding or excluding intermediate stations; the second commonoling where the first ends and continuing one hundred like or the second commonoling where the first ends and continuing one hundred like conditions. Thus any number of extra sircuits may be added to a long wine for the purpose of absorbing local business of the second continuing one hundred miles of the source. In addition to this Phonoplex circuits may be deskilated between two or more offices on a wire, whether they be intermediate or terminal, without necessarily oquipping any other portions of the same system of the same system.

DUPLEX AND QUADRUPLEX WIRES.

The Phonoplex System can be applied to duplex or quadruplex wires and operated from the same terminal, intermediate offices may be cut in and permitted to work, so on an ordinary Moroe circuit, without interfering with the operation of duplex or quadrupkx instruments at either end. This enables a long structure of the operation of a try to the property of the control of the cont

CONDITIONS OF LINE.

In wet or heavy weather, whon Morse wires are rendered aimost unvortable through the presence of heavy escapes, the Phonoplex circuits on the same times are not in the least impaired. Instances have been frequent where Morse signals could be transmitted only half the length of a wire, owing to the cases mentioned, while the Phonoplex system was operated the whole distance the same as under the most formal heavy distance the same as under the most formal heavy distance.

APPARATUS.

The apparatus for the equipment of au office consists of a key, transmitter, magnotic coil, small resistance box and the phone—which last responde to incoming signals; two condensors, two calls of gravity battary and four of electropoin, and the whole is arranged to occupy no more space than ordinary Mores instruments.

"The odventeges cleimed for the system have been
clein demonstrated on our lines by precised expefrience."

H. P. DWIGHT, Cont. Manager.

Greet N. W. Tol. Co., Torento.

GENERAL DESORIPTION OF THE COMPONENT PARTS

OF THE

PHONOPLEX' SYSTEM OF TELEGRAPHY.

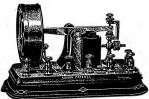


The Phone.

The above out represents the phone. A hollow column of brass resting upon a wooden base encloses the magnets. At the lower end is a rack and plinton by which those can be adjusted with reference to the disphragm. To the sentre of the latter there is attached a screw-threaded pin with thumb nat and binder at the top and execting the pin loosely is a split-

hardened steel ring which rests upon the disphragm. When the latter is snapped by the attraction of the momentary ourrent in the magnetic tit throws the ring violently against the stopnuts and produces a sharp, loud click. The steel ring has a pin projecting from its add tath passes between two prongs, which, while permitting free up and down motion, prevents the ring from turning and altering the sound.

Over the top of the phone there is clamped a thin brass plate as a protection for the projecting screw.



The Transmitter.

This device is interposed between the key and the magnetic coil. The former operates the negreet of the transmitter, the object of which is to send uniform currents to the line and also to short-circuit the phone each time the coil battery element is broken, and thus obviate the amonyance which would otherwise be caused by the violent discharge close to the displange.

"I consider it well worth the money that we have agreed "to pay you for it." CHAS. R. HOSMER, Manager,

Canadian Pacific Ry. Tolegraph.



The Magnetic Coil.

In a small magnet is stored the energy which is exerted on the line for the purpose of operating the phones. As it is necessary to produce an instantaneous discharge, a condenser is connected around the points of the transmitter, which makes and breaks the circuit around the coil.



The Key.

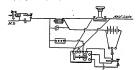
The key is so constructed that when the lower is "opened." or thrown to the right, it doese the circuit round the magnetic cell through the polute of the transmitter, and when closed," or throw to the lot, it opens this battery and at the same time slort-circuits the magnetic cell. The necessity for this list in the first that an open clearl electro-plot battery of low resistance is employed, which it is destrable to use only when consider requires the transmission of signals, and also

that the resistance of the coil has an audible effect in the phone when it remains in the line to retard incoming currents.

Thus, while the manipulation of the key accomplishes all the objects it is desirable to attain, it introduces no innovation, as the same movements to which operators are accustomed are maintained—"opening" for the transmission and "closing" for the reception of business.



A small resistance box is interpolated in such a way that when the current through the magnetic coil is broken on the up-stroke it passes through the spools. This is to produce an audible distinction between the up and down movement as manifested in the phone, the former being lighter than the latter, so as to prevent confusion that otherwise would be occasioned by openstor getting the "back-stroke."



The above diagram shows all the instruments in place. All Morse keys and relays within the limits of a phonoplex circuit are bridged, as represented, by a condenser through which pass

"The phones ore in daily use, and with very good "results."

O. A. DARLTON, Supt. Tolograph,

Richmond & Donvillo R. R. Co.

the induced currente that openie the phones. It will be readily seen that the main line, which passes through the magnetic passes through the magnetic passes through the former being charged and dichelarged by such sections of the passes of the former being charged and dichelarged by the control of the transmittee. This explains our previous statement to the effect that a phonoplex circuit remains intact so long as there is no actual becausing of the writes to which it is statement.

DIAGRAMS OF VARIOUS METHODS

ESTABLISHING EXTRA CIRCUITS ON MORSE WIRES

THE PHONOPLEX SYSTEM OF TELEGRAPHY.

The following diagrams will illustrate the manner in which extra circuits may be derived on Moree lines.

COMMERCIAL WAY OR RAILWAY WIRES.

DIAGRAM No. 1.



The black line represents the established Morse circuit.

• represents the offices through which it passes.

The dotted line represents the extra phonoplex circuit.

The above diagram shows all offices equipped and doubled

In order to understand thoroughly the advantage derived from these extra circuits, as shown in the above and following diagrams, it is only necessary to bear in mind the fact that a phonoplex circuit provides facilities between such points as are included in it, the same as though an additional wire had been strung without reference to the line to which it is attached.

"We are working both (Morse and Phenoplex) on the "circuit in question, with great advantage to the telegroph "business of the Company."

J. W. LATTIC, Supt. Tolograph, Lohigh Valley R.R. Co.

The above shows half the offices doubled in their capacity. Those which are touched by the dotted line can communicate with each other either on the Morse side or by means of the phonoplex circuit.

In the "blind" stations—those which the dotted line avoids—the keys and relays are bridged by condensers to afford a channel through them for the phone currents. They can at any time be included in the phone circuit by the introduction of the necessary instruments.

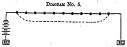


Diagram No. 3 shows a phonoplex circuit established botween intermediate offices.

The induced currents which operate the phones in this circuit are thrown to the ground at the phonoplex terminal etations through condensers. Thus it is not necessary to bridge the keys or relays of offices outside these points.



Diagram No. 4 represents a wire equipped to half its length with the phonoplex system.



 $\dot{\mathbf{D}}_{\mathrm{tagram}}^{\mathrm{N}}$ No. 5 illustrates a through phone circuit establishment lished on a way wire.

DIAGRAM No. 6.

Diagram No. 6 represents a through wire three hundred miles in length and illustrates the manner in which three extra phonoplex circuits, each of one hundred miles, may be established for the purpose of absorbing local business.

DIAGRAM No. 7.

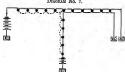


Diagram No. 7 shows two Morse wires running in different directions, but parallel for a portion of the distance.

"The advantages accruing to us by the use of yeur "Phenoplex instruments equal the same privileges as we "obtained from a rogularly equipped Morse line."

10. W. STACER, Supt. Telegraph,
Phila., Reading & Pettsville R. R. Co.

The first is phonoplexed to half its length, and the induced control are then thrown into the second wire and pass through a partial number of its stations. In this way communication is established between a number of offices on each wire which otherwise are unable to work direct with each other.

DIAGRAM No. 8,

Diagram No. 8 represents a Morse duplex circuit, the wire passing intermediate offices.

The illustration shows how communication may be established between these intermediate stations, or any of them, by cutting them in on a phonoplex circuit annexed to the duplex

DIAGRAM No. 9.



Diagram No. 9 in the same manner illustrates the phonoplox system applied to a quadruplex line for the purpose of utilizing it as a way wire.

. It will be readily seen from these few illustrations that the phonoplex system is capallo of a great variety of convenient combinations, which it would be impossible to effect by means of any other known system of telegraphs.

MAINTENANCE.

The cost of maintenance is very slight. The only actual outby required is for the provision of battery material. Of course this expenditure varies with the amount of work done, but, assuming the phonoples: transmitter to be in constant operation for twa're house during each of the thirty days, the cost of renewing the battery will not exceed one dellar and fifty cents (8.50) per mouth.

PRICE LIST.

Instruments may be procured direct from the authorized manufacturers, who have furnished the following quotations:

Phone	\$10.50
Magnetie Coil	
Transmitter	
Rheostat	1.85
Way	2.50
Coil Condenser	8.00 10,00
Bridge Condenser	10,00 / 2,00
Battery (per cell complete)	1.75

Edison Speaking Phonograph Company

This folder contains printed material issued by, or relating to, the Edison Speaking Phonograph Company, which was organized in 1878.

The following Items have been filmed:

- 2,
- "instructions for the Management and Operation of Edison's Speaking Phonograph" (1878)
 "Edison's Speaking Phonograph, Instructions for Operating Experimental Apparatus" (e.a. 1878)
 "Edison's Parlor Speaking Phonograph, Instructions." (e.a. 1878)
 "Edison's Parlor Speaking Phonograph, Instructions." (e.a. 1878) phonographs (1878, 1881?)

INSTRUCTIONS

Management and Operation

ÈDISON'S

SPEAKING PHONOGRAPH

PHILADELPHIA:

1878

EDISON'S SPEAKING PHONOGRAPH.

DESCRIPTION AND INSTRUCTIONS FOR OPERATING.

The adaptation of this wonderful discovery to the practical uses of commerce and social life not having, as yet, been completed, in all its mechanical details, this company is prepared to offer to the public only that design or form of apparatus which has been found best adapted to its exhibition as a novelty.

Of this class of Phonographs, we make two styles: One for the general purpose of exhibition, and one for the drawing room and scientist's sanctum.

The mechanism of each is precisely the same. The performance differs only in these particulars:

No. 1. The exhibition instrument has a cylinder grooved with

No. 1. The exhibition instrument has a cylinder grooved with twenty-four threads per inch.

No. 2. The drawing room instrument has a cylinder grooved with forty threads per inch.

This gives to No. 2, the advantage of nearly double the recording surface on a cylinder of the same size. It also adds a trifle to the distinctness of the articulation, and approximates more nearly the quality of the voice.

In point of volume of sound, and in general effectiveness in illustrating the working of the apparatus to an assemblage of any considerable number of people, there is no appreciable difference between them.

No. 1. Is all of iron, except the cylinder, which is of brass. The iron work is all neatly japanned and ornamented. It is mounted upon a neat white wood box, in which is a drawer for the small tools and supplies which accompany each machine.

No. 2. Is all of brass, hand-filed and beautifully finished throughout. The fly-wheel, base, etc. being of brass, the instrument is given a rich appearance. It is mounted upon a handsome rosewood and inlaid box, with drawer for tools.

Bach instrument is furnished with the following list of Folltools, etc:

1. This Letter of Instructions.

2. 5 pounds of special made Record Foil.

3. I Oil Stone. 7. I Fannel.

4. I Oil Can.

8. r piece Rubber Cushion. 5. I Screw-Driver. 9. 1 " " for wedge.

6. r Centering Pin. 10. I " Wax Cement.

11. 6 Prepared Stylus'.

Each instrument is packed for shipment in a neatly made box. of 134 inch stuff, water tight, and with heavy fron handles on the ends. The instrument is so braced in this box as to render its damage in transit well nigh impossible. The outside dimensions of this box, are

Length-2 feet 10 inches.

Width-1 foot 2 inches.

Depth-r foot 2 inches Total weight of instrument and box, 175 pounds.

When properly adjusted the Phonograph will speak load enough to be distinctly heard by an audience of from three to five thousand people. It is the character of the sound that makes this pos-

sible, apparently it is barely a fourth as loud as the original voice, yet its "voice" may be heard at an almost equal distance. Price of No. 1 Instrument, S

Terms, part payment in advance, balance C. O. D. No.

No Phonographs loaned or rented.

The Record Foil especially manufactured for the Phonograph, may be had of S. Bergmann & Co., 104 Wooster St., New York. There are thirty sheets to the pound,

It is put up only in 5, 10 and 20 pound boxes. Not more than 20 pounds can be shipped safely in one box.

Price, 45 cents per pound. Boxing, 25 cents.

Terms, one-half eash in advance, and balance C. O. D.

Extra Stylus' and Diaphragms may also be had of the same

Price of Stylus', i5 cents each. " Diaphragms, to cents each.

It is very rare for a Diaphragm to give out: in point of fact they improve by use, and are only damaged by earelessness or aecident. No other parts ever require renewal.

DESCRIPTION.

Explanation of figures in accompanying drawings.



- A box to elevate the instrument to accommodate the fly-wheel which is higher than the instrument proper. This box is fur-nished with a drawer for tools, etc.
- 2. The framework of the machine.
- 3. Two smooth bearings for the shaft. 4. Cast-steel shaft carrying the cylinder.
- A screw thread upon the end of the shaft, to give the instru-ment a gradual lateral motion whilst being rotated. 6. Heavy fly-wheel, to give a uniform motion. (Very im-
- portant.),
- The cylinder upon which the foil is placed to receive and reproduce the sound.
- reference the sound.

 8. A screw thread or groove corresponding to that upon the shaft, the object of which is to remove all support from under the shaft, the object of which is to remove all support from under the fold at the precise point where the styling branch upon it. Thus permitting the fold to be more readily indented by the styling than would be possible if the surface undermeath the foll was solid.
- 9. A slot cut across the cylinder to receive the two ends of the foil, and a steel and rubber rod or wedge, which is pressed in on the foil to hold it.

11. An upright arm for holding the mouth-piece, diaphragm and stylus combination in proper position.

12. Centre screws for moving the month-piece to the right or left, as may be required to bring the stylus to a position exactly in the centre of a groove.

13. A screw for regulating the depth of the groove made in the record foil by the stylus.

A eam (adjustable), to lock the upright arm in position, while a record is being made or reproduced.

Figure 2.

 Diaphragm of mica—a thin plate which vibrates in unison with the voice, or other sounds thrown upon it. 2. A stylus or needle-point for recording the movements of the diaphragm npon the foil, and for re-traversing the record thus made, and giving back to the diaphragm its original vibratory movement, and con-sequently reproducing the sounds.

3. A cushion made of rubber tubing, the function of which is to destroy the too metallic sound which is had from direct metallic contact between the stylus and plate. 4. A steel spring to hold the stylus rigidly in position, weakened near the base so as not to exert any pressure upon the diaphragm.

5. Wax—so placed as to hold the cushion very firmly to the plate, and also the stylus spring firmly to the cushion, (exceedingly

Figure 3.

r. A hard rubber mouth-piece, into which the vocal

or other sounds are known.

2. A cushion of rubber tubing, placed across the orifice in the mouth-piece, so that by screwing the mouth-piece into its frame, a pressure of this cushion is had upon the inside of the diaphragm, thus enabling any desired tension to be obtained apon the diaphragm—the end to be obtained being more perfect articulation, and a. ore natural tune.





1st. To but the Foil on.

A TENEDO EN PROPERTO DE LA TENEDO DE LA TENEDO DE TOMBANDO DE LA CONTRACTOR DEL CONTRACTOR DE LA CONTRACTOR

Keep the foll perfectly free from kinks, draw it firmly around the cylinder, so that when fastened it is perfectly smooth and free from buckles or looseness in every part. Let the under edge pass over the slot just reaching the opposite edge, but not passing it, press the wedge into the slot with the ends of the fingers, deep enough to prevent the styles from touching it.

2. The Dampener. (Fig. 3.)

2. The Mangheer. (Fig. 3.)
To dampen the vibrations of the dispiragin, turn the mouthpiece to the right. This causes the rubber tubing to put an increased tension plant fig. 1st. cause the rubber tubing to put an increased tension plant fig. 1st. common a strong note into the mouth-piece while holding the finger lightly on the stylus. When tension is alack the stylus will prick the finger very decidedly. Keep turning the mouth-piece to the right by small degrees, until the movement of the stylus is precupilly diminished. It is then ready for use. If it is found upon trial to be dampened too much, it may be readily adjusted to the proper tension by experimenting with the voice

3. The Stylus Adjustment. (Fig. 2.)

3. The Signia Augustument. (1932, 22).

The first thing to do in adjusting the stylus is to turn the regulating acrew (Fig. 1, No. 13) to the right, enough to prevent the forward into position; then turn the regulating server to the left gradually, until it describes a slight line on the foil. Now see to the adjustment of the stylus into the centre of the growner upon the reginder. To do this, take the pointed iron pin (called a "centre pin"), press the pointed end upon the inc described by the stylus. The centre pin will cause the foil to be depressed into the groove hearest the line. You will then be able to see how the growe hearest the line. You will then be able to see how near the stylus is to its proper position. If too far to the left, take the blunt end of the centre pin and turn the centre screws $\{Eig.\ r, Ko, r, 2\}$ to the right gradually, until the line made by the stylus passes directly through the centre of that made by the centre pin, taking care always to keep sufficient tension upon the upright arm, by tightening the centre serews, to enable it to just upright arm, by agatening the centre series, to ensore it to use support the weight of the upright at any angle it may be placed. This is to prevent any side movement of the stylus. Now, the regulating screw may be turned to the left until a groove is made of the proper depth, which is always shown by the sheet of record foil accompanying the instrument; say about 1-32 of an inch deep.

Care must be observed in locking the upright into position. It should always be locked very rigidly to prevent the mouth-piece from being forced forward when the lips prets upon it in speak-ing, and to ensure its going sufficiently forward at all times to cause the stylus to make the proper depth of groove. This locking cam (Fig. 1, No. 14) has two adjustments. It is itself a serew, and may be turned further in or out, as may be required to bring the steel lips into the angle slots; and the slots them-selves being made at an angle, impose a grip upon the lips as they are pressed into them.

In effecting the adjustment of the stylus, as well also as at all times when using the instrument, observe carefully this

CAUTION:

Never turn the instrument backward, or permit it to drop backward slightly, by checking its momentum with the handle. The surest means of preventing this is to invariably stop the instrument, by placing the hand upon the balance wheel instead of the

Never remove the carrying aut from the shaft thread until the stylus has been withdrawn from the foil; otherwise, the stylus is drawn across the grooves and is liable to be broken.

4. The Movement of the Cylinder.

The best average rate of speed at which to rotate the cylinder is about sixty revolutions per minute. To reproduce the sounds in as near as possible their original tone, precisely the same speed must be had in the reproduction as in the recording. A uniform speed is very important, especially in the reproduction of all

The reversal of the cylinder is effected by releasing the carrying nut (Fig. 1, No. 10.), and slipping the shaft to the right, through the smooth bearings, all the while keeping up a forward rotation of the cylinder. This maintenance of the rotary movement of the cylinder while the nut is being forced into or substrawn from the thread, is important to facilitate the operation of the nut, and to prevent the nut from being becked on by of the thread instead to prevent the nut from being becked on by of the thread instead.

5. To effect the best Record.

To speak to the instrument with the greatest effect, the lips should be placed as far into the mouth-piece as possible, consistent with a clear and distinct utterance of the words. The best tones are the deep, strong chest tones. The best in quality is the fine soprano of a lady or child.

6. Reproduction of the Sounds.

To reproduce any sounds which have been recorded, return the stylus to the original starting point, by moving the cylinder to

the right, as provided in Article 4. Lock the stylus again in position, place the funnel (Fig. 4) on the mouth-piece, and rotate the cylinder precisely as when making the record.

7. Renewal, fixing and shape of Stylus.

This is by far the most important of all the details of the Phonograph. The volume of sound and the perfection of the articulation depend almost wholly on the shape and position of the stylus.

Fig. 2, shows the proper position. The diaphragm, No. 1, should be perfectly flat and free from buckles.

The stylus, No. 2, should be shaped as shown in the drawing, like a chisel with a short bevel, the bevel resting upon the foil parallel with the cylinder.

No. 3, a rubber cushion made of tubing about one-quarter of an inch long. The steel spring, (No. 4), which holds the stylus, should be clamped in the holder, so as to permit the top of it to just reach the centre of the cushion, which cushion is placed exactly in the centre of the plate; this brings the stylus itself, a trifle, say one-sixtcenth of an inch below the centre of the plate, which has proven to be the most effective position. In cementing this cushion to the plate, and the spring to the cushion, great care must be had to obtain solidity of contact. The best method is to place a small piece of wax about half the size of a pea, on the plate, touch it with a heated screw-driver or small flat piece of metal, holding the cushion on with the thumb lightly at first. until the wax has melted and run under the cushion, then putting some pressure on it and causing the remaining wax to form a little bridge between the cushion and the plate, (avoid getting the wax on the upper section of the cushion, as it must have a certain degree of clasticity across its centre), hold the cushion down until the wax has cooled, then repeat the operation on the other side of the cushion. It will be found more convenient to do this by taking the mouth-piece from the upright, and laying it on the table. When the cushion has been thus placed it should be flat on the bottom

To fasten the spring to the cushion, take a piece of wax about one-sixteenth of an inch in diameter, insert it between the spring and the cushion, and hold the heated metal piece on the top end of the spring until the wax has thoroughly melted, pressing it down firmly all the while—as soon as the wax is thoroughly melted, substitute a cool piece for the heated piece; to hold it down until the wax.

has thoroughly set, then press the spring down hard with the finger, three or four times, to restore elasticity to the cushion, taking care not to loosen the spring from the cushion, or the cushion from the diaphragm.

If at any time the instrument appears to be less effective than usual, examine the coment between the spring and the cushion, and if not very frush jeld, recer it, and, nine times out of ten, the result yill be beneficial. It has been thought well to be thus explicit and elaborate in these instructions, because of the fact that few have ever seen the

It has been thought well to be thus explicit and elaborate in these instructions, because of the fact that few have ever seen the Phonograph, and have no data by which to judge as to whether or no they obtain the full capacity of the instrument. If these instructions are carefully followed, the most perfect novice will be able to obtain the full capabilities of the Phonograph.

A good strong voice and a distinct utterance are the requisite qualifications of a good operator.

The Edison Speaking Phonograph Co.

66 READE STREET, NEW YORK.

E. H. JOHNSON, Secretary.

(Form 503.)

EDISON'S SPEAKING PHONOGRAPH.

INSTRUCTIONS

Operating Experimental Apparatus.

PRECAUTIONS.

Do not move the cylinder while the arm is in position until the conditions are right for the proper action of the subossing point upon the foil. Do not lock the arm in position unless the foil is upon the cylinder.

Always withdraw the arm to run the cylinder back to the starting point,

In operating the machine always begin from \$\frac{1}{2}\$ to \$\frac{1}{2}\$ inch from the edge of the foil; if too close, or off the edge, the point is apt to eatch and tear the foil, or wedge itself sidewise and out of conter. Do not set the point so deep as to tear the foil.

Handle the point with care to prevent its becoming detached from the rubber cushion, or the cushion from the disphragm.

TO PUT THE FOIL ON.

Gum one end to the depth of one-fourth inch with the gum furnished (shellne varnish), hold the gummed and hetween the thumb and forefinger of the left-hand at the load of the cylinder, with the gummed side toward the cylinder, alip the ungummed ond under the cylinder, eaching it between the thumb and forefinger of the right-hand and drawing it firmly up and around the cylinder. Then draw the gummed not forward, overlapping the ungummed ond and pressing the two edges fruity together. Great cure must be taken to get the foll on firmly around the cylinder and without creasing.

To adjust and center the embossing point run the cylinder to the right until the embossing point is user the left-hand edge, but not beyond fit then move the arm forward geneity until the point rests upon the foll with sufficient pressure to leave a mark; then take the small from emboration pin and press it on the mark forcing the foil into the groove of the cylinder, and observe if the ombosed mark is exactly in the easter of the grover—in ot, adjust the point to the right on as the case may be by means of the small adjustable-serows at the hase of the support carrying the month-piece. When thus adjusted to the center of the grovers, the embossing point may be set to make any depth of groove desirable by means of the thumb-serow through the end of the arm. Usually the best depth of a groove is $\frac{1}{2}$ of an inchi; that is to say, just sufficient to keep the point drawn marking and groove in the foll, no nature how great the amplitude of the vibrations of the plate.

RATE OF SPEED OF TURNING CYLINDER.

The cylinder should be rotated at the same rate, when the words are being reproduced, as when they are spoken into the apparatus. Uniformity of speed is very essential, especially in producing a nuncial tone. The best rate is about 80 revolutions per minute.

TO MAKE THE RECORD.

To epeak into the instrument with the best effect, the lips should be held gently against the mouth-piece and the gustieral or chest tones used rather than the less powerful roof tones. A little practice will show how to obtain the best effects.

TO REPRODUCE.

Withdraw the arm, then revorse the cylinder until the embossing point is a trifle beyond the original starting point. Then replace the arm and rotate the cylinder again.

To get a much greater volume of sound place a paper or motal fannel or horn on the mouth piece, the small ond of such fannel should be a trifle larger than the opening in the mouth-piece, in order to prevent if from slipping through and thus resting on the disphragm.

The record may be recorded a number of time.

THE EMBOSSING POINT.

This is made of the point of a No. 9 sewing-needle slightly flattened on two sides by rubbing on an oil stone, the sharp edges being taken off by gently touching them on the stone; as the character of the articulation, howrord, depend very much upon the proper shape of this point, we profer to supply thom and will keep them constantly on hand.

THE RUBBER CUSHIONS.

The object of these essistions is to dampen the vibrations of the disphragm: that hetween the embossing point and the disphragm is fratened to both by means of cultisary sealing-wax; and abould it become loose, it may realily be fratened by healing the head of a small nail and shell said the amount against the spring or disphragm until the wax notes, then remove the nail, still heading the spring or disphragm against the outbion until the wax sees.

The small bits of rubber tube placed between the edge of the mouth-piece and the disphragm should be occasionally renewed, as they get set and less their elasticity. In putting them in care must be taken us to injure the disphragm in year-great pressure or indesting it with the knife-hade or other pointed instrument used in inserting them.

SUGGESTIONS FOR EXPERIMENTS.

Recite at first in a strong voice familiar nursery rhymes, conversational sentences, etc., then as the ear becomes more familiar with the peculiar character of the sounds, include in more pretentious recitations.

Vary the tone of voice in all ways. Ohange the tone to a higher or lower key in reproducing by rotating the cylinder faster or slower.

Hold the nose when speaking and get a nasal twang.

Imitate every species of animal, crow like a cock, cackle like a hea, squeal like a hog, etc., etc. Imitate every species of sound known. Sing songs, airs, duets (in the funnel). Play the cornet or other similar instrument, etc., etc.

All music should be quick movement, as without clock-work sufficient uniformity of speed is not obtainable to produce properly a sustained note.

THE EDISON SPEAKING PHONOGRAPH CO.

E. H. JOHNSON, Gen'l Agent.

P. O. Box 5,529, Now York.

THE GREATEST NOVELTY OF THE AGE. PRICE ONLY \$10.00.

SPARLOR SPEAKING PHONOGRAPI

INSTRUCTIONS.

Explanation of Figures in above Drawing.

r. Handle by which the shaft is turned both backward and

tight or loose.

the foil to hold it

from the cylinder groove or lower it, in order to give it proper. position.

be pressed gently down upon screw No. 5. 7. A ring of brass, which acts as a guide for the tin foil, so that 2d. The Stylus Adjustment.

the records can be reproduced at any future time.

r. Diaphraem of mica-a th in unison with the voice, or other & 2. A cushion, the f too metallic sound v

contract between the stylus 3. A stylus or needle-point for recording the ments of the diaphragm upon the foll, and f traversing the record thus made, and giving back to t disphragm its original vibratory movement, and o

sequently reproducing the sounds. A spring to hold the stylus rigidly in position,



INSTRUCTIONS FOR OPERATING

1st. To put the Foil on.

Keep the foil perfectly free from kinks, draw it firmly aroun the cylinder, so that when fastened it is perfectly smooth and free ickles or looseness in every part. Let the under end nto the slot by the rubber covered steel rod) his must be pro-deep in the slot with the ends of the fingers, that the n will not touch it when working. One side of the tin foil should always, touch the brass ring on the left hand end of cylinder, so position.

6. A swinging arm which removes the mouth-piece from cylinder, so that if the recorded tin fold sheet is put on another instrument, it to let it be run backward—when speaking upon the foil, this must will reproduce it equally as well as on the instrument that made it.

"centre pin") press the pointed e foll to be depressed into the groove nearest the line; you able to see how near the stylus is to its proper position

far to the left, turn the adjusting screw 3, Fig. 1 to the nally, until the line made by the stylus passes directly through the centre of that made by the centre pin. If, on the contrary, it is too far to the right, the screw 2, Fig. 1, must be osened, and the screw 3, Fig. 1, also; this will allow the lever to be pushed back against screw 3. Screw 2 must now be made fact, and the stylus can be adjusted to centre of groove by turning screw 3 to the right in the same manner as before.

THE GREATEST NOVELTY OF THE AGE. PRICE ONLY \$10.00.



INSTRUCTIONS

Explanation of Figures in above Drawing.

1. Handle by which the shaft is turned both backward and forward.

- 2. A screw by which the arm holding the month-piece is a tight or loose 3. A screw by which the arm is moved to right or left, in onle
- 4. A slope tiler to receive the two ends of the foil, and a steel a rod or wedge, which is pressed in o the foil to hold it
- 5. A screw which, as at is lowered or raised, will lift the pen m from the cylinder groove or lower it, in order to give it proper 6. A swinging arm which removes the mouth-piece from cylinder.
- to let it be rnn backward—when speaking upon the foil, this must be pressed gently flown upon screw No. 5.
 7. A ring of brass, which acts as a guide for the tin foil, so that 2d. The Stylus Adjustment. the records can be reproduced at any future time.

1. Diaphragm of mica-a this plate which vibrates lating serger in unison with the voice, or other sounds thrown upon it.

2. A cushion, the function of which the current the too metallic sound which the metallic sound which the current of the curren contract between the stylus a

3. A stylus or needle-point for recording the morements of the diaphragm upon the foil, and for re-2. traversing the record thus made, and giving back to the diaphragin its original vibratory movement, and consequently reproducing the sounds.

4. A spring to hold the stylus rigidly in position.



Fig. 3. A funnel for incress the volume of sound in the reproduction.

INSTRUCTIONS FOR OPERATING.

1st. To put the Foil on.

Keep the foil perfectly free from kinks, draw it firmly around the cylinder, so that when fastened it is perfectly smooth and free from buckles or looseness in every part. Let the under end pass Paris use james of the paris The other end is now lapped over it, .. are pressed down into the slot by the rubber covered steel rod; whis must be pressed so deep in the slot with the ends of the fingers, that the needle will not touch it when working. One side of the tin foil should

always touch the brass ring on the left hand end of cylinder, so that if the recorded tin foil sheet is put on another instrument, it will reproduce it equally as well as on the instrument that made it.

The first thing the stylus, is to turn the regunough to prevent the stylus from ton until a slight line is to the adjustment of the stylus nto the centre of the grooves upon the cylinder. To do this, take he pointed iron pin, (called a "centre pin") press the pointed and upon the line described by the stylus. The centre pin will ause the foil to be depressed into the groove nearest the line; you will then be able to see how near the stylus is to its proper position, If too far to the left, turn the adjusting serew 3, Fig. 1 to the

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In effecting the adjustment of the stylus, as well also as at all No z, a felt cushion. The spring, (No. 4), which holds the stylus should be absented by the spring of the stylus should be absented by the stylus should be absented

CAUTION -

Never turn the instrument backward, or permit it to drop backward slightly, by checking its momentum with the handle. The surest means of preventing this is to invariably take the presence off the lever, and let it spring up before you stop turning.

The best average rate of speed is about sixty revolutions per minute. To reproduce the sounds in as near as possible their original tone, precisely the same speed must be had in the reproduction as in the recording.

4th. To effect the hast Reco

To speak to the natural should be placed as far intelligence of the words. The hest tones are the deep, strong chest tones.

The best in quality are the fine soprano of a lady or child.

5th. Reproduction of the Sounds.

To reproduce any sounds which have been recorded, return the cylinder to the original starting point, (first allowing the stylus to spring up, so that it will not be injured when the cylinder is turned back) press the stylus again in position, and holding the funnel Fig. 3 on the mouth-piece, rotate the cylinder precisely as when making the record.

hith. Renewal, fixing and shape of Stylus.

depoid almost wisk an ampe and position of the stylus.

Fig. 2, shows the proper position. The diaphragm, No. 2, should be perfectly flat and free from buckles.

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To fasten the spring to the enshion, take a piece of wax about one-existent of on inch in diameter, insert it between the spring and the enshion, and hold the sent piece on the top end of the spring until the wax has the enderly predict, pressing it does firmly all the white—as soon as the enderly predict, pressing the white—as soon as the enderly predict, pressing the white—as soon as the enderly predict, and the state of the predict of the beated piece, the state can object for the beated piece, to the case there are the state of contract of the beated piece, to the case the state of the contract of the state of the sta

usuil, examine the cement between and if not very firmly held, reset it.

cetive than the cushion,

If these instructions are carefully for owed, the most perfect novice will be able to obtain the full capabilities of the Phonograph. A good strong voice and a distinct interance are the requisite qualifications of a good operator.

The adaptation of this wonderful discovery to the practical uses of commerce and social life not having, as yet, been completed, in all its mechanical details, this company is now prepared to offer to the public only that design or form of apparatus which has been found best adapted to its exhibition and the state of the public only that design or form of apparatus which has been found best adapted to its exhibition and the state of the public of

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4. SONG—"She Wandered down the Mountain Side."

Mink. BELLE, COLE.

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IEF M. Gennet W. Menne M. Gregorius of the Company of the Company

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Millard

2. SONG-" Waiting,"

Mms. BELLE COLE.

3. ORGAN—"Fantasie,"

Mr. G. W. MORGAN.

4. SONG—"L'Arditi Waltz."

Mme. BELLE COLE,

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 Prof. ROBBRT SPICE.

6. Explanatory Remarks on the **Telephone** and **Phonograph**,

Mr. E. H. JOHNSON.

7. Practical Domonstration of the Edison Musical Telephone and Edison Speaking and Musical Phonograph.

With Recitations, etc., by Mr. E. H. JOHNSON
Soprano Solos, by Mns. BELLE UOLE

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Callejon de Betlemitas núm. 8.

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Esto invonto, verladoramente milegrese, hace of: A las personas las palabras que se han hablato, 6 la mástica que se ha tocade en cualquier legar, de no cantre que distro mullac. Ocundo esto instrumento se uas no hay secred posible, pues el raudo mas inasguificante en un outro te trainfis inmediatemento.

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v De Gress, 1º calle de Plateres númere 5.

v Jena Imp

EDISON PHONOGRAPH! THE

Prof. Effects' intest improved PHOMORIMAN, in TALLIN, LAVOIRS, MINGS, do., of the protection may in the protection in the service of the control of the protection of the prot

THE WONDERFUL SINGING TELEPHONE Music sent by telegraph over the wires, and distinctly heard by

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 "List of Subscribers . . . San Francisco, October 15, 1879"
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Central Office System.

San Francisco, August 16, 1879.

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LOCATION.

LIST OF SUBSCRIBERS. BUSINESS.

NAME.

	"Abrams & Carroll	Druggists	3 and 5 Front.
	*ABRAMSON & BACON	. Drugeists	Dunont and Source
	*Abranson & Bacon	. Druggists	717 Clay.
	*Ackerman Bros	.Faney Goods	123 Kearny.
	*ÆTNA IRON WORKS	. Pendergast & Smith	217, 210 and 221 Fremo
	*AHRENS & CO	Chicago Brewerv	Lazo Pine
	*Alameoa B. & L. Ass'n	.Ch. C. Volhere, Pres't.	700 Market
	"Alaneda B. & L. Ass'n	. Moritz Friedrich, Sec'ry.	200 California
	*Alaska Commercial Co	Louis Sloss & Co	710 712 Sansome
	*ALMS HOUSE		Mission Ocean Read
	*ALLEN, C. R	Cool	tan Basis
	*Allen & Lewis	Commission Marchante	ana California
	*Anogreson, Ggo. L	AAOMBACE	Davidia
	*Armstrong & Wright	M'f'rs of Boots and Show	62 and 60 Crannon
	*Army Headquarters	THE PER COLUMN TO SERVE STATE	tor Creshton
	ASHBURNER, WM	Daridanos	IOS Stockton.
	*Asiiton, Citas	Doom Co.	tor4 rine.
	*Assessor's Office	City and County	120 Sutter.
	*AYER, WASHINGTON	Phonisis -	New City Tings.
	*BADLAM, A	Annual Office	1022 City.
	*Badlan, A	Assessor's Omce	New City Hall.
	*Baker & Hamilton	. Residence	708 California.
	*BAKER & HAMILTON	. Hardware	7-19 Front
	*BALOWIN HOTEL	. rimidware	2nd and Townsend.
	*BALDWIN PHARNACY	Alex. MacAbee, Bes. Mr.	n'r Market and Powell.
	BALDWIN FILAKNACY	.11. B. Slaven	Market and Powell.
	*Bancroft, A. L. & Co	. Printing Department	721 Market.
	*Bangs, Eowaro	.Gmin	Mission Bay Warehouse-
	*BATCHELDER, R. N	Depot Quartermaster	Stockton and O'Farrell.
. 1	*BARNES, COL. W. H. L	Attorney at Law	426 California.
	*Barron, Eowaro	.Residence	413 Hyde.
	BARNEY, GEN'L B. G	Residence	2209 Jackson.
	*Bastifeim, J	Residence	1509 Gough.
	BATTERY ST. BON'O WARRIE'E.	Geo. C. Boile & E. Danfor	th. Bottery and Filbert.
	*BAY-CITY MARKET	M. Gradwohl & Co	1146 Market.
	*BAY SOAP & CANOLE WORKS	Lavenson & Winter	South San Francisco,
-	*BAY SUGAR REFINERY	. Herman Meese, President	Battery and Union.
		Druggist	Sixth and Howard.
	*Bazan, F	Physicinn	850 Market.
	*BAZAN, F	Residence	1633 Mission.
	*BENSON, JOHN A	Surveyor & Engineer	507 Montgomery,
			- 1

NAME.	BUSINESS.	LOCATION.	
*BENT, E. F. & Co	.Gmin	. 18 California.	
*BENNETT, THOS	.Physleian	.716 Pine.	
*BERNARD, CHAS	.Coffee and Spice	707 Sansome	
*BERGER. C. G	. Druggist	.Cor, Eddy and Steiner.	
BERRY, GID. M	Residence	1728 Tyler.	
*Biggs, A. R	.Saloon	. Pine and Sansome.	
*BLACK, HENRY M	.Carriage Maker	851 Market.	
*BLACK POINT	Military Station.		
*BLAKE, GEO. M	. Residence	. 1601 Van Ness.	
*BLAKE, ROBBINS & CO	. Paper Warehouse	.516 Saemmento.	
*BOARD OF EDUCATION	.Genemi Office	. New City Hall.	
*BOARD OF EDUCATION	Col. J. A. Laven	.30 Sacrainentu.	
*BOARD OF EDUCATION	.J. W. Taylor	.501 Market,	
*BOARD OF EDUCATION	.A. C. Illester, President	.S. F. Stock Exchange B'g.	
*BOARD OF EDUCATION			
*BOARD OF EDUCATION	.Carpenter Shop	Pine and Lorkin.	
*BOARD OF SUPERVISORS	. Clerk's Office	. New City 11nll.	
*BOARD OF TRADE		.123 California.	
*Bonz, GEO. C	.Warehouse	. 1201 Buttery.	
*Bods, GEO. C	Office	.30 Market.	
*BOOTHE, W. H	.Capitalist	.320 California.	
*BOOTHE, W. H	. Residence	.Cor. Fillmore & McAllister.	
*Boyson, Thomas	. Physician	.112 Kearny.	
*BRADBURY, W. B	. Centennial Planing-Mills	. 556, 572 Brannsn.	
*BRAY BROS	.Commission Merchants	.226 Clay.	
*BROADWAY BON'D WAREII'SE.	.E. Danforth	.Broadway and Battery.	
*Brown & Maxwell	.Short Hand Reporters	.604 Merchant.	
*BRYAN, W. J	. Druggist, Apothecaries Hall.	. Grand Hotel,	
*BUCKINGHAM & HECHT	. Boots and Shoes	. 528 Market.	
*BUCKINGHAM & HECHT			
BULLION MINING CO	. Jos. Gruss, Sec'y	.418 California.	
*BURNETT, G. G	.Apothecary	. 327 Montgomery.	
*BURT & Co	.Druggists	.California and Fillmore.	
*Caurera, Roma & Co			
*CALIFORNIA CHACKER CO			
*CALIFORNIA CRACKER CO	.Bakers	. Battery and Broadway.	
*CAL. DRY DOCK CO	.Dry Dock	. Hunters Point.	
*CAL. DRY DOCK CO	.Office	.318 Chlifornia.	
*CAL. DRY DOCK CO	.Floating Docks	. Spear and Bryant.	
*CAL. FURNITURE CO	. Furniture	, 222 Bush.	
*CAL. FURNITURE CO			
*CALIFORNIA PAINT CO	. Paints	.329 Market.	
*CALIFORNIA PAINT CO	. Paints	.27 Stevenson.	
*CAL SILK MAN'P'G CO	. Robt. Morrison	,Cor. P.& 11thAv.,South S.F.	
*California St. R. R. Co		. Cal. and Cemetery Ave.	
*CALIFORNIA ST. R. R. Co		. California and Larkin.	
*CALIFORNIA ST. R. R. Co.		.California and Kearny.	
*CAL WIRE WORKS CO	.Wirc	.6 California.	
*Campbell, J. B	. Post Commander	Black Point.	
*CAMPI'S RESTAURANT	.N. Glamboni & Co	533 Chy.	
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NAME.	BUSINESS.	LOCATION.
*CARR, J. S. & Co	holesale Jobbing Grocers.	600 and 602 Front.
*CENTENNIAL PLANING MILLS. W	. B. Bradbury	. 556, 572 Brannan.
*CENTRAL PACIFIC R. R. COG	eneral Offices	Fourth and Townsend.
*CENTRAL DRUG STOREAl	bramson & Bason	Sutter & Dupont
*CHADBOURNE & COFi		
*CHICAGO BREWERY	. H. Ahrens	. 1420 Pine.
*CHIEF OF POLICEO		
*CHISMORR, GROPh	ysieinn	920 Market.
*CHRISTY & WISEW	/ool	607 Front.
City Lung & Co	hinese Merchants	521 Kearny.
CHY LUNG & COC	hinese Merchants	640 Secremento.
*CLAYTON, CHASG	min Desler	400 Front.
*CLUB STABLES	. S. Crittenden,	Taylor Street.
*Code, Elfelt & CoPr	acking and Conning	125 Main.
*Code, Elfelt & CoP	acking and Conniag	314 Washington.
*Coey, Gen. James	ostmaster	30 Twelfth.
*Coffin & MayhewD	ruggists	Mission and 20th.
*Cole, R. BEVERLYPI	aysielan	518 Sutter.
*COLEMAN, WM. T. & COS	hipping and Commission	California and Front.
*COLEMAN, EVAN JP		
*COLLINS, S. P. & COSr	doon	329 Montgomery.
*Conro, F. D. & Son	olden Age Flouring Mills.	717 to 721 Battery.
*CONTINENTAL OIL AND TRANSPO		
*CONTINUITAL OIL AND TRANSPO		
*Соок, Н. N	anf'r Leath'r Belt'g & Hos	e. 415 Market.
*Cook & Ellis	ant's Leath'r Bell'g & 1109	37 Fremont.
*COSMOPOLITAN HOTEL		
*COUNTY CLERKS OFFICE		
*COUNTY CLERKS OFFICE		New City Itali.
*CORPORATION YARDF		Forreto Ave. Det. 220 & 230.
*Cox, J. W. & Co	ire Department	Comments
*Cox, J. W. & Co	unningman's warenouse	Green and From.
*Cox, J. W. & Co	torth P. D. P. Warehouse	Court but Pal & Mandage
*CRANE & BRIGHAM	iumooon van. vanenouve	ran Menhat
*CRITTENDEN, C. S		
*CRITTENDEN, C. S		
*CROCKER, H. S. & COS	Antioners and Printers	Sansame and Sacramento
*CROSETT & COE	Conforment Assess	220 Sutter
*CUNNINGHAN'S WAREHOUSEI	W Cox & Co	Green and Front
*Curring & Co F		
*DAILY STOCK REPORTF		
*DANFORTH, EE	loosdway Bon'd Warehouse	. Broadway and Bottery.
*DANFORTH E R	esidones	1200 Mason St.
*Dayis Bros	Golden Rule Bazzar	410 Kenmy.
*Davis Bros	olden Rule Bazzar	718 Market.
*DAY, THOS	Gasfitter	122 Sutter.
*DEANE, C. T	hysician	321 Ellis Street.
*DEGENER, E	tesidence	Eddy and Laguns.
*DEMING, PALMER & COF	Gour Mills	202 Davis.

NAME.	BUSINESS.	LOCATION.
*Deway & Co	Publishers	oz Sansome.
*Dewey & Co	Publishers 4	4'Clny.
*DEYOUNG, CHAS. & CO	S. F. Chroniele50	6 Montgomery.
*DEYOUNG, CHAR. & CO	S. F. Chronicle4	3 Clay.
*DEYOUNG, CHAS. & M. H	Residence	7 Eddy.
*Dodge, W. W. & Co	Grocers	of Front.
*Dodge, Sweeney & Co	Wholesale Provisions40	6 Front.
*DOLLIVER & BRO	Imp. Leather & Shoe Findga 10	7 Post.
*DONAHUE, PETER	Capitalist42	6 Montgomery.
*Dorr L. l	Physician, 118 Dupout R.	es, Mission & 20th
*Douolass, Wn. A	Physician	6 O'Farrell.
*DUNITAM, CARRIGAN & CO	. Hardware, Iron, Steel, etc 10	7 Front.
*DUNPHY & HILDRETH	Butchers	3 Kenrny.
*DUNMIY & HILDRETH		
*DUNPHY, WM	Residence	11 Mason.
*DURKEE, J. L	Fire MarshalO	ld City Hall.
*DUTARD, H	Commission Merchant21	7 and 219 Clay.
EARLE, H. H	Residence	22 Jackson.
*Ecket, J. N	.Physician	24 Geary.
*EOWARDS, PICKENS & FULTON	.The Commercial Agency4	os Cal.
*Egan, John	Commanding PostF	ort Point.
*EINSTEIN BROS & Co	Boots & Sh0es29	& 31 Battery St.
*EINSTEIN BROS. & CO	Boots & Shoes11	5 & 117 Hayes St.
*Einstein, Z	Residence	509 Gough.
*ELDRIDGE, OLIVER	Pres't Cal. Dry Dock Co31	8 California.
*ELPELT, A. B. & Co	Imp't'rs Cloth'ng and Gents }	o8 and 110 Sansome.
ELLIOTT, MRS	Residence18	117 Eddy.
*EUREKA WAREHOUSE	A. J. GoreM	ontgomery and Chestnut.
*EVENING POST	Publishers50	2 Montgomery.
*Evers, Henry	Noltings Billiard Saloon80	d Kearny.
*** EXAMINER "	Daily Paper52	3 Washington.
*Evans, A	Druggist	ayes and Laguna.
*Excelsion Stables	Lot. D. Slocum92	r, 923, 925 Sutter.
FALKNER, BELL & CO	43	o California.
*Fasision Stables	McCard, Bridge & Co El	lis near Mason.
*FEIGENBAUN & Co	Fancy Goods	o Sansome.
FELTON, C. N *FERGUSON JOHN	Capitalist40	2 Montgomery.
*Figlo, Stephen D	Saloon30	4 California.
*FIRE DEPARTMENT	Electricism	21 California.
*Fire Department	Cities Engineers OfficeO	id City Hall,
*FIRE DEPARTMENT	**************************************	orporation Yard.
*Fire Department	Engine No. 2	ish, near Kearny.
*Fire Department	Engine No. 3 Ca	illomia, nr. Lenvenworth.
*Fire Department	Engine No. 7	iencia and Guerrero.
*FIRE PATROL	frost No. 2	st and Pulmore.
*FIRE PATROL	Station 1	evenson and Ecker.
*FLINT, PEABODY & Co	omnon xGi	ove and Larkin,
*Flint, Peabody & Co	Paston. 71	Carnomia.
*FLOOD, NOAH F	Attomac. Desidence	onnan ana Seventh.
FROM F	Attorney, Rendence19	O4 Laguns

All names prefixed by star () are properted with the Central System

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NAME. B	USINESS.	LOCATION.	
*FLOYD, T. W. & Co Overland *	Warehouse	Townsend bet. 2d and	gd.
*FLOYD, CAPT. RICHARD S Capitalist.		415 First.	
*FORT POINTMilitary St			
FOSTER, A. WResidence.		1213 Jones.	
*Fountain Saloon			
*Fraser, E. JPhysician.		221 Powell.	
*FRENCH MUTUAL BENEVOLENT SOCIETY	*************	.510 Jackson.	
*FRIEDRICH, MORITZCommissio		. Bryant and Sixth.	
PRINDRICH, MORITZCommissio	n Merenant	. 309 California.	
*FULTON IRON WORKSIlinekley, 1 *FUNCKE & COTanners	spiers & Hayes	. 207-213 Fremont.	
*GALLI & CoFruit and G		9th St. near Brannan.	
*GAMBLE, JAMES	ommission	. 510 Stasome.	
*Games, Fer'dLiquor De		302 Atomgomery.	
*GRTLESON & LANDISLeather am	A Trimations		
*GHRADELLI & DANZELCoffee and	I Cules	543 Market.	
*GIAMBONS, N. & CoCampl's R	estaurent .	ran Cles	
*GIRRS, GRO. W. & Co Iron, Steel	& Blackem's Tools	12-20 Framont	
*Grans, W. CSec'y Cal.	Dry Dock Co	218 California.	
*GILBERT & MOOREFurniture.		210 Bush.	
*GILBERT & MOORE		. cc6 Brannon	
*GLADDING, McBEAN & Co Dmin and	Sewer Pipe	. 213 Market.	
*GLADDING, McBran & Co Dmin and	Sewer Pipe	1312 Market.	
*GLOVER & WILLCOME Curled Ha and Beds	ir Manufacturers ding Supplies.	65 & 67 New Montgome	ry.
*GOODYEAR RUBBER CO		. 577 and 579 Market.	
*GOODALL, PERKINS & CO Steamship	Agents	10 Market.	
*GOLDEN AGE FLOURING MILLS, F. D. CON	aro & Son	717 to 721 Battery.	
*GOLDEN RULE BAZAAR Davis Bros		718 Market and 419 Kea	my
*Govz, A. J Eureka W.	irehouse	.Chestnut and Montgom	ery
"GRADWOIL, M. & CoButchers "GRANGERS' BUSINESS ASN'N		1146 Market.	
*GRAY, N. & CO		. 100 Davis.	
*GREATHOUSE & BLANDING Attorneys	3	041 Sacramento.	
GREENWOOD, MTrensurer C	N. P. T.J. C.	.324 Pine.	
*Gregory, H. P. & Co Pre. Machin	nery Danet	a and a California	
*GRISAR, EWool Ware	house	Fifth and Toursend	
*Gruen'& VogelsangSaloon		are Think	
*GRUEN & VOGELSANGSaloon		Lan Fourth	
*Gwin, Hon. Wst. M Residence.		.618 Harrison.	
*HAGGIN, J. BAttorney		. St Nevzela Block.	
*Haggin, J. BCapitalist.		1250 Taylor.	
*HALLIDIE, A. SSalesroom	and Office	.6 California.	
*HALLIDIE, A. S Wire & Wi	re Rope Manufy.	Valleio and Sansome.	
*HALLIDIE, A. S Residence .		. 1026 Washington.	
*Hall, Eoward F. Jr Residence.		915 Lenvenworth.	
*HALE, WM. F		, 520 Kearny.	
*HALE, W. FPhysician		. Residence 516 Taylor.	
*HANSCOM, W. W	Works	Potrero.	
*Hansen, CR. & Co Employmen	4 Agency	.624 and 626 Clay.	

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. NAME.	BUSINESS.	LOCATION	
*HASEROUCK, H. C	Commanding Post1	residio.	
*HASTE & KINK	Coal and Iron	Heale.	
*HATHAWAY, E. V	Rincon Pt. U.S. Bn'd War'sc	Spear and Bryant.	
*HATHAWAY'S H. S. RONDED	WAREHOUSE., E. V. Hathaway.,	Spear and Bryant.	
*HAWLEY, MARCUS C. & Co.	If'dw'e and Ag'lt'I Imp'm'ts	Besle and Market.	
*Flawley, Marcus C. & Co.	H'dw'e and Ac'lt'l Imp'm'tsl	Suxome, bet. 4th and 5th.	
*HECHT BROS. & CO	Boots and Shoes	528 Market.	
*HECHT, M. II	Residence	201 Van Ness Avenue.	
*HEALTH OFFICE	City and County	124 Genry.	
*HENOERSON, JNO. JR	Coal Dealer	17 O'Farrell.	
	Maaufactures of Chairs		
*HIESTER, A. C	Stock Report	S. F. Stock Exchange B'ldg.	
HIGGINS & COLLINS	Wood and Lumber	Beale St. Wharf.	
HIGGINS & COLLINS	Wood and Lumber	East and Market.	
*Hinckley, Spiers & Hay	zsFulton Iron Works	207-213 Fremont.	
*Hirschveling, Jos. O	Physician	1326 Genry.	
*Horart, Wood & Co	Boots and Shoes	5 Sansome.	
	Box Factory		
	Residence		
*HOCHROPLES, R	Merchandise Broker	205 Pront.	
HOCHSTADTER, E	Keswence	320 Geary.	
PETERN D. D. In	Supt. Carrier's Dept. P. O	1222 Secrements	
*Moramon C D	Chief Quartermaster	Presidio	
*Hormon Meenin & See	TSON Stoves, Metals & Tinware.	112 California St.	
	TSON . Warehouse		
	W. W. Hanscom		
*HOPKING W. S.	Residence	L122 California.	
*HOUSE OF CORRECTION		Old San Tose Road.	
*HOWLAND, R. S	Commission Merchant	206 Front.	
*HUBBARD, H. 11	Physician	22 Genry.	
*Hudson, IL C	Mustard and Spice Mili	124 Main.	
*Hue, Kai & Co	Shoe Manufacturers	127 Clay.	
HUETER BROS. & CO	Pioneer Varnish Works	12 Second.	
	Pioneer Varnish Works		
*HUME, R. D. & Co	Salm'n P'k'rs & Com'n Mehts	.309 mml 311 Sacramento.	
	Co Hardscare, Iron, Steel, etc		
"Hutchinson & Mann	Insurance Agency	N.E. Cor. Sansome and Cal.	
*HUTCHINSON, F. W	Residence	1620 Jnckson.	
	Kesidenee		
*Howes, E. K. & Co	Woodenware.	122 Front.	
HOWES, E. K. & Co	seJ, W. Cox & Co	37 Main.	
*Tunnerses Courses	saj. w. cox & co	Old Con Tree Bond	
*Incresoy II If	Physician	Ou can just Rold.	
*Tackook Banca	Agricultural Machine Works	Goth and Dissorts	
*Trumper Tony	Hooper's South End Warch's.	Inner and Postered	
*Iony Brow	Wholes'e Manufs. Fine Shoes'.	S IV one V Ners Auth Wall	
*JOURNAL OF COMMERCE	Publishers	Clay and Sansome.	

^{*}All names prefered by eter (*) are connected with the Central System.

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NAME.	BUSINESS.	LOCATION.
JUSTICE MINING COJ. P	Cavallier, Sec'v	410 California.
KAPLIN, LOUISReg	lstmr of Voters	New City Hall.
KAST & COFash		
KEARNEY, PETER A Dru	zgist	gor Folsom.
KEIL, F. CDru	ggist	4th and Market.
*KELLOGG & CARVELLLon		
*KELTON, J. CAss\	Adj't General	Prestilio.
KENNEOV, M. ASim	idard Theatre	Bush St.
*KEOOII, JOHN	interials	73 and 75 New Mont.
*King of William, C. James { Min & Co,		
KIRKPATRICK, JNOChle	of Police	331 Fell.
KITTLE & COOffs		212 California.
*Knox, Gro. TNo		
*Kullman, Wagner & CoHid *Kullman, IIBoo	es and Lenther	45 Clay.
*Ladd, Geo. S	st. G. anil S. Tel. Co	222 Sansome.
*LAND, GEO, SPre *LAKE & McKoonAtto		
LANE, Dr. L. CPhy		
Lane, Dr. L. CPhy	elelen	Clay and Buchman
*LANGLEY & CO., CHASDn	enriste	. Front and Pine
*LAVEN, COL. J. A	PP	. 20 Stemmento.
*LAVENSON & WINTERBay	Soon and Candle Worl	s. South San Francisco.
*LAVERY, I. V Suot, North Point		
*LEHENBAUN L. & CoGro		
*LEBENBAUN, GOLDBERG & Co., Gro	icers	Californin and Polk.
*LEIPNITZ & CODr.	egists	236 Sutter.
LENOS SHIRT FACTORY L. I		
LENOS SHIRT FACTORY L. I	.emos, Prop'r	613 Kenmy.
*LEVY, S. WBoo	ts and Shoes	115 and 117 Hayes.
*LEVY, S. WBoo	ts and Shocs	29 and 31 Battery.
*Lewitt, WaPhy		
*Lick HouseGeo.		
*LICK TRUST		
*LLOYD & NEWLANDSAtt		
*Lonbard WarrinouseKd *Loomis, GeoPin	logg & Carvell	Lombard and Sansome.
*Loomis, Gro	M 500104	Delese Hearthy.
*Low, C. Apolipia & CoGer	7 Commission March'nt	e 208 California
*Lowey & CoCor		
*Lusk, A. & CoWb	doole froit Dayler	F24 rml F26 Clay
*MCALLISTERS & BERGIN,, Att	orneys	38 Nevada Block.
*Macdonough, J.,Co:		
*Macdonougii, J	d	121 Folsom.
*MACONDRAY & COShi	poing and Commission.	204 Sensome.
*MADISON & BURKERes	l Estate Agents	501 Montgomery.
*Madison, J. IIRes		
*MARRIOTT, FPsl	disher	609 Merchant.

^{*}All names realized by star (*) are connected with the Central System.

NAME.	BUSINESS.	LOCATION.
*MARRIOTT, F	D-MA	LOCATION.
*MARSHALL, BENJAHIN	Disseleles	, 2307 Jones.
*Mastick, Belcher & Mastic	Y Allomana	W. COL 21st & Valencia
*MAXWELL, R. T	Physician	320 Monegomery.
*MAYHEW, EARNEST & Co	Cools	
*McClung, J. W	Barldenos	LEAR POLICE
McCong. Gen't. Inc	Editor, Alta	res California
"MCCORO, BRIDGE & Co	Fashion Stables	Ettle near Manage
McCord, Bridge & Co	St. Lawrence Stables	212 Sutter Ct
"McDonnell, I. I	Druggiet	6th and Market
"McDowell, Invin	Major Gen'l Commonding	Disab Dates
MCKENNA & GREANY	Commission Merchants	age Deserve
MCMENOMY, I. II	Batcher	California Manhar
MENDOCINO LUNBER CO		
MENDOCINO LUMBER CO,	Office	.40 California.
*MERRILL, P	Unit Carpet Beating and	453 Stevenson.
MERRY, FAULL & Co	Provision Packers	. Black Point.
*MEYER, CAPT. II. L. E	. Residence.	N.W. cor. Webster & Clay.
*MEYERS, R. C. *MICHELSSEN, BROWN & Co.		
*Michelsen, Brown & Co.	. Pork Packers	. Foot of 9th.
*MISSION BAY WAREHOUSE	Edward Bangs.	Channel and 4th.
MOLERA, E. J *MONTAGUE, W. W. & CO		
*Montes C.	Stoves and Tinware	110 Battery.
*Morkow, WM. W	Chairman Republican Para 1	37 Clay.
Morry II M	Chairman Republican State Central Committee	Nevada Block.
MORTON, I. & Co.	Desective Agency	12 Safe Deposit.
MOSTON, I. & Co	Draymen	104 Battery.
MULLAN & HYDE	Land Agente	silis and Taylor.
All names prefixed by star (*) are	connected with the Central Syste	

	,	
NAME.	BUSINESS.	LOCATION.
*Murphy, Grant & CoWholes	le Dry GoodsBr	ish and Sansome.
MURPHY, JAMES Physician		7 Van Ness Ave.
- MURPHY, JAMES Physicine	65	Clay.
*MUTUAL ICE CO	35	Tehama.
*MYERS, GILMAN & CO Paelfic	lox Factory 51	Sacramento.
"Myers, Gilhan & Co Pacific I	Box Factorygth	and Harrison.
*Naphitaly, Freidenrich & Ackerna	Attorneys421	5 California.
*NEUSTAOTER BROSImporte	5Ba	ttery and Pine.
*NEUSTAOTER BROSStandars *NEUSTAOTER, DAVIDResident	Shirt Frictory Go	ugh and Grove.
*New Constitution PartyIfend C	F	e Manter.
*Newman, CarltonProp'r C	Dans Works 18	o atomyomery.
*Newhan, CarltonProp't C	lass Works Kir	og Straet
*Newton Bros. & Co Gracers	20	California.
*Newron, Morris Resident		6 Twenty-first.
*NEW YORK LIFE INS. CO Alex. G.		
NicollThe Thil	or	Market.
NicotaThe Tail	811o	Kearny.
NICOLLThe Tail	or50	Montgomery.
"NORTH PT. DK. FREE WAREH'E. J. W. C	ox & CoFo	ot Sansome St.
"N'TH PT. DK. GRAIN WARRIE'E., J. V. L.	avery, SuptSan	some & Chestnut.
*Nourse & MITCHELL Overland *NUTTING, CALVIN & SON Pionour I	Frt. Transfer Co 4th	and King.
*OCCIDENT STABLESA. Water	ron Works121	-123 Fremont.
*Occidental FoundrySteiger &	Kan 10	triact
*OCCIDENTAL GRAIN WARRIOUSE	Wm M Store Fir	at & Tournsend
*Occidental HotelChis. L.	Wetherbee, Maunter, Mc	nteomery and Bush.
*ODD FELLOWS ASSOCIATIONOdd Fel	lows Building 329	Montgomery.
*Odo Fellows Cemetery	7	netery.
OLIVER, WM. LETTS Mining S	ecretaryRoc	m 13, Safe Deposit Bldg.
*OLYMPIC CLUB		Post.
*Opera Salioon	Feldmann327	Bush.
*ORIENTAL HONDED WARED'E. Pool &	larrisBr	man and First.
*OVERLAND FRT. TRANS. CoC. P. R.	R. Freight Dept Kis	g Street.
*Overland Warehouse T. W. F *Pac. Barrel & Keg Factory, Flint, Pe	loyd & Co3d	and Townsend.
*PACIFIC COAST STRANSII'P CO	mody & Cosr	Mandani Seventa.
*PACIFIC MAIL S. S. CO Dock	Nie	et and Brancon
*PACIFIC ROLLING MILLS		
*PACIFIC ROLLING MILLS	Pot	rero.
*PACIFIC BOX FACTORYMisers, C	ilman & Co \$15	Sac. and 9th & Harrison.
PACIFIC OIL & LEAD WORKS	Kin	er het, ad and ad.
*Pacific TanneryKullman,	Wagner & Co 45	Clay.
*Pacific Transfer Co	110	Sutter.
*Pacific Transper CoC. P. B	ggage OfficeOnl	dand Ferry.
*PACIFIC VINEGAR WORKS, J. L. Ko	ster 415	Fulton.
*Pacific Vinegar WorksJ. L. Ko	ster323	Front.
*Page, Moore & CoCommiss *Painter, EnlenDruggist	on Merchants213	Ciny.
*PAINTER, ENLEN		y and Mission
Annual Massacritical Dinggist		I MAG AT ISSION.

NAME. BUSINESS. LOCATION.

*Richter, C. Max. Physician 126 Kenny, Thurlow Block

S. F. STRAHDOAT & TRANSFORTATION CO. Miller & Enton, Agri. Jackson St Whi.

S. F. TEN CREAT PARCEL DELIVERY. 16 Post.

SCANNELL, D. Chief Engineer Fire Dept... Old City Hall.

SCHLUSTER & VOLERG. Carpets. 7.09 Market.

SCHUIVT, MAURICE. Residence. Sutter and Geugh.

SCOTT & McCoan. Hay and Oralin. Pier at Stuart.

SCOTT, II. T. Residence. 1822 Seramento.

SCOTT, Iavino M. Residence. 909 Harrison.

SEARNY, W.M. Duught. 3690 Market.

* All names profixed by star (*) are connected with the Central System.

LOCATION

*U. S. Brancii Mint
*VAN WINKLE, I. S. & CO Iron, Stoel & C'mberl'd Coal, 413 and 415 Market.
*VERDENAL, D. FMining Secretary327 Pinc.
*Verneil & Wellington Hay and Grain
*VERMEIL & WELLINGTON Hay and Gmin Berry, bet. 5th and 6th.
*VERMEIL, J. L
*Wagner, TheoSurveyor-General
*Wagner, Theo
*WAKELEE, H. P. & Co Druggist
*WALKINGTON, T. GSouth Point WarehouseBerry, het, 3rd and 4th.
*WALOSTKIN, ALithographerSecramento and Sansome
*WALDSTEIN, A
*WANGENHEIM, Sol. & Co Preking and Canning 120 Davis.
*WATERMAN, M. & CO Produce & Com'sn Merch'ts111 Clay.
*WATERS, ARTHUROccident Stable
*WATERS, CHASPlumber30 O'Farrell,
*WEEDIS, J. P. & COCoal Dealers
*Weiss & FeldmannOnera Saloon
*Wellman, Peck & CoGrocers
*Wells, Farco & Co's Express. J. J. Valentine, Gen. Supt Sansome and Hallock.
*Wells, Fargo & Co's Bank Lloyd Tevis, Pres Sansome and California.
Wells, Geo. RResidencetoo; Geary.
*WEST COAST FURNITURE CO., Salesroom Second and Market.
*West Coast Furniture Co., Factory
*WESTERN UNION TEL. CO
*Western Electric Light Co
*WEYHERBER, CHAS. LManagerOccidental Hotel.
*WHARTEMBY, JAMES. Residence. 408 Ellis. *WHITE, CAPT. RUSSELL. Fire Patrol. Stevenson.
WHITE, CAPT. RUSSELL Fire Patrol Stevenson.
*WHITELAW, THOS, P. H, Shin Chandler
WHITEAU TORS. F. FUNGELL. For "parting with the parting of the parting with the parting wit
WHITTER & Co's Express. Oakland, Alameda, Brookl'n 3 and 5 Commercial.
Berkeley, Temeschi,
*WHITNEY I. P. Physician 201 Sutter.
*WHITNEY, J. P
WHITNEY, J. DPhysician204 Sutter.
*WHITNEY, J. DPhysicianLick House.
*Wiener, E. O
WILDIAN
WILLIAMS, BLANCHARD & Co., Dock
Wilson & WilsonAttorneys
Wilson, J. Y. & Co Provision Packers 300 Market,
WILSON, INO. SCOTT Residence
WILSON & HUYCHINSON Stock Brokers 322 Pine,
WINDELL, H
Windson House,
Wilston & Hortentson Sodd, Holeders 332 Pins
YATES & COPaints and Oils
YATES, R. R Sell. Agt. Cnl. Slik M'rg Co. 585 Market.
YATES & CO Oil Warenouse
ZELNER, WMDruggist

MEDICAL DIRECTORY

Physicians and Surgeons,

CONNECTED WITH THE CENTRAL SYSTEM. RESIDENCE AYER, WASHINGTON.....410 Kennsy.....*1622 Clay. Office Hours, 8 to 9 a. m., 2 to 4 p. m. BAZAN, F..... *850 Market *1633 Mission. Office Hours at Residence, 11 n. m. to 1 p. m. and 4 to 6 p. m. Office Hours, 2 to 4 p. m. BOYSON, THOMAS......*112 Kearny......*112 Kearny Office Hours, 11 a.m. to 1 p.m., 6 to 8 p.m. Generally at Home between 11 p.m. and 8 a.m. CHISMORB, GEO......*920 Market.....*920 Market. Office Hours, 1 to 3 and 7 to 8 p. m. COLE, R. BEVERLV......*518 Sutter......*518 Sutter. Office Hours, 12 to 3 p. m. DEANE, C. T......*321 Billis.....*321 Billis. Office Hours, 12 to 3:30 and 6 to 7:30 p. m. DORR, L. L. (Coronor)......*118 Dupont................2320 Mission Office Hours, from to a. m. to 12 m., 3 to 5 p. m. At Home, 5:30 p. m. to 9 a. m. DOUGLASS, WM. A.....*126 O'Farrell......*126 O'Farrell. Office Hours, 1 to 3 and 7 to 8 p. m. ECKEL, J. N*324 Genry.....*324 Genry. Office Hours, 12 a. m. to 1 p. m., 6 to 7 p. m. FRASER, E. J......*221 Powell.......*221 Powell. Office Hours, 8 to 9 a. m. and 1 to 2 and 6 to 8 p. m. HALE, WM, F.....*520 Kearny.....*516 Toylor. Office Hours, 2 to 5 p. m. HIRSCHFELDER, JOS. O...126 Kearny......*1326 Geary. Office Hours, 1 to 3 p.m. Sundays, 10 to 11 a.m.

HUBBARD, H. II.......*22 Genry......*22 Genry.
Office Hours, 12 to 3 p. m.

INGERSON, H. H.*323 Genry.............*323 Genry.

A etar indicates the location of Telephone, whether at Residence, Office, or both

Office Hours, 9 to 10 a. m., 4 to 6 and 7 to 8 p. m.

Office Hours, 1:10 to 4 p. m. At Home, 7 to 8 p. m. LEWITT, WM......*16 Turk.....*16 Turk. Office Hours, 1 to 3 p. m., and in the Evening. MARSHALL, BENJAMIN.....*S. W. cor, Valencia and 21st Office Hours, to a.m. and 8 p. m. MAXWELL, R. T......*135 Kenmy......*135 Kenmy. Office Hours, 2 to 5 p. m., and in the evening. McNULTY, J. M.....*118 Dupont......*Pnince Hotef. Office Hours, 9 to 10 a.m. 1 to 3 p.m. At Hotel after 5 p.m. McNUTT, W. F......121 Montgomery......*808 Bush. Office Hours, 12 to 3 and 7 to 8 p. m. MOORE, C. W......*652 Market......*652 Market. Office Hours, 8 to 10 s.m. 12 to 4 and 8 to 10 p.m. MURPHV. JAMES*659 Clay*1613 Van Ness. Office Hours, 8 to 9 a. m., 1 to 3 and 7 to 9 p. m. PALMER, GEO. 11......*424 Post......*424 Post. Office Hours, 8 to 10.a. m. 3 to 4 and 7 to 8 p. m. PEASE, G. M.....*125 Turk.....*125 Turk. Office Hours, 1 to 4 p. m. . PROSEK, J......*O'Farrell and Dupont.....*418 Van Ness. Office Hours, 12 to 2 and 7 to 8 p. m. Sundays, 11 to 12. RICHTER C. MAX*126 Kearny (Thurlow Block). *914 Post. Office Hours, 12 to 2 and 7 to 8 p. m. SHORB, J. C......*407 Post......*407 Post. Office Hours, 8 to 9 a. m., 3 to 5 and 7 to 8 p. m. SIMPSON, JAS......*234 Post......814 Sutter Office Hours, 9 a. m., 1 to 3 and 7 to 8 p. m. SIMS, HARRY L.....*703 Market.....*703 Market Office Hours, 1:30 to 4 p. m. Office Hours, 12 to 3 and 7 to 8 p.m. WHITNEY, J. P......*204 Sutter.....*1007 Sutter. Office Hours, 3 to 5 p. m. WHITNEY, J. D......*204 Sutter.....*Lick House. Office Hours, 9 to 10 n. m. 12 to 2 and 7 to 8 p. m. WORTH, SIDNEY *426 Sutter *426 Sutter. Office Hours, S to 9 a.m. 2 to 4 and 6 to 71/2 p.m. ses the location of Telephone, whether at Residence, Office, or both

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RESIDENCE.

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BRAMS & CARROLL 3 and 5 Front.
RRAMSON & BACONSulter and Disposit.
DRANGON & BACON
Sixth and Howard.
PROGRA C P
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COPPIN & MAVIEW
TRANE & BRIGHAM
Para are a
First and Folton.
Markel and 4th.
LANGLEY, CHAS. & CO
PURPLE S. CO
Powell and Union.
Narkel and bile.
narramen part EM
PAINTER, EMLENMisson and 11th.
REDINGTON & CO529 Market.
SEARBY, WM. M
SEARBY, Wat. ot
STAUB, II
SLAVEN, II. B
SLAVEN, II. B
WAKELEE, H. P. & CO
ZELNER, WM
ZELNER, WM

ATTORNEYS-AT-LAW.

BARNES, W. H. L	426 California.
THOOD NOAH F	1904 Laguni.
GALLAGHER, THOS. J	602 Commercial.
GREATHOUSE & BLANDING	324 Pine.
HAGGIN, J. B	51 Nevada Block.
KNOX, GEO. T Notary Public	444 California.
LAKE & NCKOON	310 Pine.
LLOYD & NEWLANDS	13 Nevnda Block.
MASTICK, BELCHER & MASTICK	520 Monigomery.
MCALLISTER & BERGIN	18 Nevada Block.
NAPHTALY, FREIDENRICH & ACKERMAN	
ROCHE & DESBECK	an Montgomery Block-
	seo California

American District Telegraph. NIGHT-WATCHMAN SIGNALS.

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Signals are given from each instrument, at proper intervals, and automatically recorded in moe of our offices (recopy of which is sear you daily). No two instruments can give the same signal, and upon the failure, praou ANY CAUSE, of the correct signal to record itself in our office, a police office will immediately visit the premises to ascertain the cause of neglect or trouble; and in case may supplied necleonataness are noticely, remain on duty at the premise and in case may supplied necleonataness are noticely constrain on duty at the premise of the premise are noticely constrained as a standard of the premise of the premise

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ł	CHICAGO BREWERY	turn Pine.
ł	CALIFORNIA FUSE WORKS	Missien Creek
	CUTTING PACKING CO	es Malo
ı	DINKRESPIEL, S. B.	are thank
	FRENCH SAVINGS AND LOAN SOCIETY	are Bush
ı	GERMAN SAVINGS AND LOAN SOCIETY	est California
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ı	MURPHY, GRANT & CO	Sarange and Bush
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Central Office System.

San Francisco, October 15, 1879.

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Telephones connected with the Central System have been placed at the

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222 SANSOME STREET, 961 MISSION STREET, POWELL and UNION, HAYES and LAGUNA. S. W. Cor. KEARNY and SUTTER, TWENTIETH and MISSION, 833 SUTTER STREET, BUTCHERTOWN,

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GEO. S. LADD. President. INO. I. SABIN, Superintendent.

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1258	Acrenus Pres	Druggats	717 Clay.
236	-ACKERNAN DROS	Faney Goods	123 Kearny.
220-	-/ETNA IRON WORK	SPendergast & Smith	217 to 221 Fremont.
1721-	ALASKA COMMERCIA	L CoWnrehouse	310, 312 Sansome.
171	ALASVA COMPRESA	L CoTannery	I hard and Townsend.
1603	ATMS HOUSE	a co rannery	Ninth near Brannan.
-0.	Arms Constitution		Mission Ocean Road
20110	ALTA CALIFORNIA.,	Daily Newspaper	529 California.
229-	ALLEN, C. R.,	Coal	120 Beale.
9023m-	ANGERSON, GRO. L.		Description
trian-	ARMY HEADQUARES	RS	1 o7 and o9 Stevenson.
	Asumiranes We	Residease	105 Stockton.
ross :	Asumou Corre		1014 Pine.
3020-	Assertor, Clias	Room 80	120 Sutter.
170-	nantation's Office .	City and County	New City Hull.
2041—.	AYER, WASHINGTON	Physician	Man Class

NAME.	UUSINESS.	LUCATION.
313-BACHMAN BEOF	Importers Dry Gotals .	
170*-HADLAM, A	Amessor's Office	10 and 12 Battery.
32*-BAKER & HAMILTON		7-19 Front
3036-BALDWIN HOTEL		2nd and Townsend.
3004-Baldwin Pharmaci	YII. B. Slaven	an r. Market and Powell.
334-Balfour, Guyffrig	& Co. Grain, Shipping, Com. Mc	Market and Powell.
82-BANCHOFF, A. L. &	Co Printing Department	n 316 California.
333°-BANCROPT, A. L. &	CoGeneral Business	721 Market.
108-BANGS, EDWARD	CoGeneral Business Grain	721 Market.
BARKER & SNOW		of tsylon Bay Warel'e.
273-Barnarii, Prank &	Co. Coal Dealers	408 Market.
273"-BARNARD, FRANK &	Co Coal Dealers	Last and Jackson.
252-BARNES, Cot. W. IL	LAttorney at Law	213 Jackson.
2036—Barron, Edward	Attorney at Law	426 California.
2052-BARNEY, GEN'I, II. C.		· · · 413 Hyde.
2015—Вактилы, Ј	Rosidence	2209 Jackson.
5023-HATCHELDER, R. N.,	VAREII'E Geo. C. Bolo 5 P. P.	. 1509 Gough.
127-BATTERY St. Bon'd V	VAREH'R. Geo. C. Bode & E. Danfor	Stockton & O'Farrell.
3013-BAY CITY MARKET	WORKS Lawrence V. Bode & E. Danfor	in . Battery and Fillsert.
7012—BAY SOAP & CANDLE	Works. Lavenson & Winter.	Sant a r
110-BAY SUGAR REFINER	VORRS. Lavenson & Winter. V	Manuel San Princisco.
3045—BAYLY, CHAS. A	V	Clark and Union.
2012 BAYAN, P.	Druggist	See Mark .
4001-Descrip C C	Physician	707 Samuran
3015-Black, Hundy M.		. Pine and Sansume.
199-BLAKE, ROBBINS & CO.		1601 Van Ness.
2013-BOARD OF EDUCATION.	A. C. Hiester, President Capt. Wat, A. Phillips Carpenter Shore	Folson St. Wlarf,
240 Powers P	Capitalist Cor. 1	Sao Chinornia.
2402-BOWLEY BROS		unnore & McAllister.
240 -TOWER BERGE	· · · · · Remoditory and Park	135 California.

-	NO.	NAME.	BUSINESS.	LOCATION.
-	54-Bs	ADBURY, W. B	Physician Centennial Planing Commission Mercha	Mills 556, 572 Brannan.
	127-B3	COADWAY BON'D WAREL	'SEE. Danforth	Broadway & Battery.
	5017—B1	YAN, W. J	D. Stem	Sixth and Howard.
	2051-B	YANT, HON. A. J	Residence	822 Sutter.
	67-Bt	CKINGHAM & HECHT	Boots and Shoes	Hnight and Gough.
	Bu	ILLION MINING CO	Jos. Gruss, Sec y	418 Cullfornia.
	244 BL	JENETT, G. G	Apothetary	California & Fillmore.
	158C/	ABRERA, ROMA & CO	Commission	123 California.
	3043-C/	AL CARPET BEATING M	ACUINEP. Merrill	453 Stevenson.
	108-C/	ALIFORNIA CRACKER C	DBakers	206 and 208 Sac.
	103-C1	ALIFORNIA CRACKER CO	Bakers	Battery & Broadway.
	7011—C/	AL DRY DOCK CO	Dry Dock	Hunters Point.
	117-07	L. DRY DOCK CO	Plantes Darks	Spear and Bryant,
	20-C	MARIORNIA PLECTRICAL	Works	tae Sutter
	20°-C/	AL FURNITURE Co	Furniture	222 Bush
	20-C/	L. FURNITURE CO	Furniture	640 Market
	63'-C/	ALIFORNIA PAINT CO	Paints	320 Market.
	63-C/	ALIFORNIA PAINT CO	Paints	
	7006-C/	al Silk Man'p'g Co.	Robt. Morrison	. Cor. P.& 11thAv., South S. F.
*	306-C/	nl. Stean Navigation	CoOffice	Washington St. Whf.
	87*-C2	ALIEORNIA ST. R. R. C	·	.Cal. and Cemetery Ave.
	871-01	CLIFORNIA ST. R. R. C	lo	.California and Larkin.
	277-C2	MINORNIA ST. K. K. C	Wire	California and Kearny.
			Post Commander	
	182-C	MPI'S RESTAUDANT	N. Giamboni & Co.	ran Cleu
	271-C/	SKLISLE, A. & Co	Commercial Station	ers 110 Leidesdorff.
	3056C/	RVILL MANUFACTURIN	n Co. Carriage Builders	t and a Powell.
	293-C/	ISTLE BROS	Mereliants	213 Front.
	183°m-C/	TANIA, J	Fish Market	502 Merchaut.
	- 54-Ci	INTERNIAL PLANING M	ILLS. W. B. Bradbury	556, 572 Beannan.
	213-Ci	INTHAL PACIFIC R. R. C	nGeneral Offices	Fourth & Townsend.
	139CI	INTRAL DRUG SYORE.	Abramson & Bacon, Farulture Denlers.,	Sutter & Dupont
	2012—C1	HAMOURNE & CO	H. II. Ahrens	735 Market.
	70-CI	TIPE OF PALICE	Old City Hall	Vannus Stand
	3047CI	DISMORE, GRO	Physician	nan Market
	31C1	IRISTY & WISE	Wool	
	CI	IY LUNG & CO	Chinese Merchants.	521 Kearny.
	Ct	IY LUNG & CO	Chinese Merchants,	640 Sacramento.
214	54CI	TY IRON WORKS	Low & Chartrey	26 and 28 Fremont.
	5065Ct	lark, Gro. WI	aper Hangers, Window S	hales .645 Market.
	5003-C1	LARKE, J. J	Physician	106 Stockton.
	97-CI	AYTON, CHAS	Gmln Dealer	400 Front.

o.	NAME.	BUSINESS.	LOCATION.
		ELT & CO Packing and Cosming	
022-	-Cals, R.	BEVERLY Physician	
112-	-Colenan,	WM. T. & Co Shipping and Comm	C- 6.2 Harden
157-	-COLEMAN,	EVAN JPrest. Pnc. Transfer	eg Boet
070-	-Collin &	JONES	120 Montgomers.
056-	-Concorn	D. & SonGolden Age Flouring	Mills, 717 to 721 Battery.
114	-Cox, J. V	V. & Co Humboldt Whf. Warehouse	Spent, net. Pot. & Harrison.
26	-Crani: &	BRIGHAN Druggists	Taulor Street
68	-CRITTENI	EN, C. SOffice	arr Bush
68	-CRITTENI	II. S. & Co Stationers and Print	Sansone and San'to.
27	-CROCKER	& Co Employment Agent	ex #10 Sutter.
320	-CHNNING	HAM'S WAREHOUSE. J. W. Cox & Co	
27	-DEGEN,	L. PManuf. Leather He	Eddu and Lasters
203:	-DEGENE	, E	208 California.
32	-DEGENE	JAMESDruggist	214 Kearny.
	c1-Donar	SWEENEY & CO Wholesale Provision	ons406 Front.

No.	NAME.		BUSINESS.	LOCATION.
rono	Dottives	& BroIm	o. Leather & Shoc Fin	d'cs., 107 Post.
	Dawanne	Devet ('enitalist	426 Montgomery.
	Donn I.	f	Physician, 118 Dunon	tRes. Mission & 20th.
rou6—'	DOING ASS.	WM. A	Physician	126 O'Fnrrell.
***	DIRRITAN	CARRIGAN & CO	Hamlware, Iron, Stee	l, etc. 107 Front.
60	Dimension S	Literapprox	Rateliers	533 Keamy.
	Dimension /	Managertt	Butchers	Hutchertown.
anak .	Davino	Wat	Residence	III Mason.
***	Deresen	11	Commission Merchant	217 and 219 Clay.
321-	DUTTON &	WITHINGTON	Stationers and Printer	n306 California.
	EARLE, H.	H	Residence	2222 Jackson.
276	Emokrs, A	ь М	Imp. & Dealers in Co	al109 to 115 Sacram'nto
5068-	ECKEL, J.	N	Physician	324 Genry.
206-	EDWARDS,	PICKERS & FULTON.	The Commercial Age	neyqoi Cal.
5023-	EGAN, JOS	IN	Commanding Post	Port Point.
2029	EHRMAN,	M	Residence	519 Van Ness Ave.
323-	EHRNAN,	М. & Со	Wholesale Grocers	104, 106, 108, 110 Front. 26 & 31 Battery St.
62-	EINSTEIN	BROS & CO	Boots & Shoes	115 & 117 Hayes St.
6-	EINSTEIN	Z	Books & SHOES	tree Courb
2015-	EINSTEIN,	OLIVER	Beach Cal. Day Dools	Co. 118 Celifornia
117-	BUDKHER	, OLIVER	Importer Clothing	and) a
209-	ELFELT, .	A. B. & Co	Gents Furnishing	and 108 & 110 Sansome.
	ELLIOTT,	Mas	Residence	ISI7 Edey.
5054-	BURKKA !	NURSERY	E. Meyer	Foot of Stanyon.
39"-	EUREKA '	VARKHOUSE	A. J. Gove	Mont. and Chestant. 502 Montgomery.
259-	EVENING	INRY	Phonsners	Sax Managements
188-	EVENS, I	INNEY	Noninga minimi on Descript	llayes and Lagana.
2019	EVANS, A		Dally Paper	533 Washington.
131	" EXAMIN		Lat D. Clarum	921, 923, 925 Sutter.
2025-	EXCELSIO	BELL & CO	10t. D. 510t	410 California
	FALKNER,	Cwanter	McCool Bridge & C	o Ellis near Mason.
110-	Reserve	ora Goodwan & Co	Cloth's & Furish'ne	Goods, 16 and 18 Sansone.
1167.	Resounce	BM & CO	Fancy Goods	120 Sansone.
1-8-	Erroy I	" N	Conitalist	402 Montgomery.
268	Negopon.	four	Saloon	304 California.
4002-	FIGURE S	TEPHEN D	. Electrician	2321 California.
107-	From Dr.	ARTMENT	. Chief Engineer's Off	iceOld City Hall.
104 -	FIRE DE	PARTMENT		Corporation Vard.
141-	Fine Dr	ARTMENT	. Engine No. 2	Bush, near Kearny.
2010-	FIRE DE	PARTMENT	.Engine No. 3	Cal. nr. Lenvenworth.
3031-	FIRE DE	PARTMENT	Engine No. 7	Valencia & Guerrero.
4003-	-Eire De	PARTMENT	.Hose No. 2	Post and Fillmore.
1972	FIRE PA	rk01	.Station 1	Stevenson and Ecker.
	FIRE PA	rkor	.Station 2	Grove and Larkin.
175-	-FLAVIN,	M. J	Orem LA.L. Auc. 1	louse 612 to 620 Kenray.
175-	-FLAVIN,	м. ј	. Kesidence	408 Callfornia.
2691	-FLINT, P	елиору & Со Ноли Б	. Omce	TOOL Tamen
2027-	-PLOOD, 1	NOAH F	. Attorney, Residence	

NO.	NAME.		BUSINESS.	LOCATION.
	RIOVE T. W.	A Co	Overland Warehouse	Townsend b. 2d & 3d.
111-	FLOYO CAPT.	RICHARD S	.Canitalist	415 First.
ronn-	HONT POINT		. Military Statlon.	
	Energy A W		. Residence	1213 Jones.
	Commerce Ca	TOON	Wm. Hesse, Ir	Sutter and Kearny.
rors.	Serve A L.		. Residence	612 Van Ness Avc.
folf-	Frager R. I.		Physician	221 Powell.
	Possen Mar-	HAL RENEVOLE	NT SOCIETY	510 Jackson.
48-	FRENCH HOSE	TTAL		Bryant and Sixth.
144-	FRIBORICH, A	IORITZ	Commission Mercha	nt309 California.
225-	FULTON IRON	WORKS	. Hinckley, Spiers &	Hayes. 207-213 Frentont.
72°11 —	FUNCKE & CO		Tanners	gth St. near Brannan.
30-	Gamble, Jami	88	Genl. Supt. W. U.	T. Co., 302 Montgomery.
198	-Cambs, Fer'd		Liquor Dealer	305 California.
312-	GARRATT, W.	T	Brass Foundry	Dunced
5058*-	GERMAN BENT	IVOLENT SOCIE	TV.Omce	Noe and 14th.
5058	GERMAN 1108	HTAL	.Leather and Finding	e car Market.
207-	-GETLESON &	LANDIS	Drov and Corn Ma	erchant. 301 and 303 Front.
280-	GETZ BROS. e	6 Dawren	Coffee and Spice	415 Jackson.
49-	-GHIRADELLI (& DANZAL	Campl's Restaurant	522 Clay.
182-	GIANGONI, N.	W & Co 1	ron Steel & Blackun'	s Tools 33-39 Fremont.
- 11	Common M	others & Co	Designed Sewer Pi	ine211 Market.
195-	-GLOVER & W	TILLOONIL. C	ried Hair Manufactur and Bedding Sumilies	fers 65 & 67 New Montgotn'y.
138 m-	-GOODALL, PA	REKINS & Co	Steamship Agents.	10 Market.
203-	-Golden Age	FLOURING MIL	Ls.F. D. Conro & Soc	n717 to 721 Battery.
5010-	-Golden Rul	E BAZAAR	Davis Bros	710 Sinrich.
5011-	-GOLDEN RUL	E BAZAAR		Chestnut and Montgomery.
39*	Gove, A. J.,	,	Eureka Warenouse	E.cor. Broadway and Battery.
285-	-Gowen & G	ILMAN	Storage	1146 Market.
3013-	-GRADWOIL,	M. & CO		tof Davis.
25-	-GRANGERS I	MANUES VICE	Residence	1024 Bush.
2058-	-GRANT, T. C		Carriege & Women	Makers.421 and 423 Pacific,
279-	-GRAVE, B. o	C-	Unitage of Tragon	641 Sacramento.
3043				
227				
	Course & Ve	METSANG	Saloon	215 Third
157	-Gwin, Hon.	. Wм. М	Residence	618 Harrison.

NO.	NAME.	BUSINESS.	LOCATION.
274-	HAAS BROS	Importers and Wholosale Grocer	s 100-102 California.
5065-	HAAS, GEO. &	Co Candy Manufactory	Neverle Block
:86	ILAGGIN, J. B.		1250 Taylor
2043-	HACKIN, J. B.	D F., JRStock Broker	410 California.
305	HALL, EDWAR	S Salesroom and Office	6 Celifonia
255*	HALLMIR, A.	S Wire & Wire Rope Man	Cv. Valleio & Sansome.
255*	HALLIDIE, A.	S Residence	1026 Washington.
***	Harmonn Ke	er tye Co	31 t California.
****	HARMONEY !	1 C	Presidio.
	Harry & Pres	Coof and Iron	21 Bealc.
-0-	er a constant for Date	or co Storoing and Commissio	m 20 California.
154-	HAWLEY, MAI	icos C. & Co " " " " "	Huxome, bet. 4th and 5th.
67"-	ПЕСИТ Вкоз.	& Co Boots and Shoes	528 Market.
2018-	Песит, М. Н	Residence	1201 Van Ness Ave.
210m-	-HEALTH OFF	ICE City and County	124 Geary.
6013-	HEISTER, A. C		210 San Jose Ave.
5032-	HENDERSON,	JNO. JaCoal Dealer	117 O Parrell.
324-	-Henyrich &	THYARKS Provision Packers	513 and 515 From.
	HERRHANN,	I lats and Caps	330 Kestny.
	HERRMANN, C	Tints and Cape	Lefe car for and tot
194-	-Hrywoon Ba	os. & Co Manufactures of Chairs	Mission cor. 2d.
78*			
	HOGINS & CO	OLLINSWood and Lumber	Beale St. Whart.
	HIGGINS & Co	OLLINS	East and startest.
4012-	-Hinghman, 1	r. WResidence	2237 Jackson.
225-	-Hinckley, S	PERES & HAVES. Fulton Iron Works	1206 Comm
2012-	-Hirschfelm	ns, Jos. O Physician	1320 Genry.
247-	-HOHARY, WO	on & Co Book and Shoes	11 and 12 Banks
137-	-Honse, Poss	TON Residence	Liberty St
6005-	-Honus, Cart	R Merchandisc Broker	201 Front.
5007-	-HOCHSTADTS	DUTHARD Clerk U. S. Dist. Court Ro	on ts. U.S. Court Bldger.
287-	-HOPPHAN, S	JaSupt. Carrier's Dept. I	P.O. 1332 Sacramento.
	HALLMANN A	INNUES & STREETSON, Warehouse,	Battery & Commerce.
	Manyer In	(19 1) Ament Hail's Safe and	Lock Co., 137 Market.
	Harmey V	V Reshlence	731 Sutter.
2024-	-HOPKINS, W	S Residence	821 Setter.

	NO.	NAME.		BUSINESS		LUCATION.
	160*-	HOUSE OF COR	SECTION		Ok	See Jose Roul.
		Hovey S. D.		Residence	21/	Powell.
				Commission Merc		
				Physician		
				Mustard and Solo		
	248-	IIUR, KAI & C	0	Shoe Manufacture	D 127	Clay.
				Pioneer Vnmish		
				Pioneer Vamish		
				k'rs & Com'n Merc		
				Hardware, Iron,		
	169-1	furchingon &	MANN	Insumnce Agescy	. N.E. Cor	. Sonsume and Cri
				Residence		
				Residence		
	2049	Louge F V	h Co	Woodenware		Vant Proper
				Woodenware		
				J. W. Cux & Co.		
				. Physician		
	3021-	ACKSON, BYKO	×	Agricult'l Machin	r Works Sir	eth and Bluxome.
				Hooper's So. En		
	50.14-	IORSON, W. G.,		Wood and Coal .	511	and 513 Bush.
	314-	IONES, S. L	Auctione	ers and Com'n M	rchants202	& 200 California.
				e Manus. Fine Sh		
				Publishers		
				J. P. Cavallier, S		
				Registrar of Votes		
				Fashionable Shoe		
				Druggist		
	3005-	Km., F. C		Droggist	4kh	and Market.
	1129-	Kellogg & Ca	SVELL	Lombard Wareho	seLo	mbard & Sansone.
	5023-	Килон, Ј. С.		Ass't Adj't Genem	1 Pre	sidio.
	70-	KENNEDY, M.	A	Standard Theatre	Bus	dı St.
	5010-	KENYON, C. G.		Physician	66	Mission.
		· · · · · · · · · · · · · · · · · · ·	(Curle	d Hair and Upho sterials	lstery }	
	205-	ABOGH, JOHN.	Mo	terials	73 an	n 75 New Mon.
	193-	KING OF WILLI	AM, (Manu	ufacturers of He Hy Scaled Goods.	meti-) n	6. Paraman
		C. Jan	ss & Co, ∤ cal	lly Scaled Goods.	, Broan	may or assistant.
				Chief of Police		
		KITTLE & CO.,		Office		California.
	143-	KNOX. GEO. T		Notary Public	444	California.
	3057-	KNOX, TOUN F.		Cal. Wool Desot	Towns	end, bet, 5th & 6th
				aphers and Clgar		
	30511	Contract F &	Duce Lithogr	aphers & Cigar B	. Ment on	Detter
	3031	Cases same	o C-	Commission Mere	A. Dinui 300	California
				Boots, Shoes and		
	1061	KULLNAN, SAL	z & Co	Hides	43	Clay.
				Boot and Shoe F		
	80-	LADD, GEO. S.		Prest. G. and S.	Fel. Co 22:	2 Sansome.
700	755	LADD, GEO. S.		Prest. G. and S.	Fel. Co 515	Vnn Ness.
	241-	LAKE & MCKO	ON	Attorneys	310	Pine.

NO.	NAME.	RUSINESS.	LOCATION.
	LANE, DR. L. C.		Clay and Buchanan.
216	LANK W. E	Plumber and Gas Fitter	sos Kenrny
310	-Lancing & Co. 6	CHASDruggists	Front and Pine
-35	Language Co., v	A	no Seeminanto
	-LAVAN, COL. J.	TER	les Court Can Empeloon
7000	-LAVENSON & WIN	opt. North Point Dack Grain Warehou	Charlest
152	-LAVERY, J. Y., SI	ioCrockery and Glassware	ise, Suisime & Chestina
333	-LAWTON, O. & C	CoGrocers	oog strinket.
. 1	-LEBENBAUM L. &	CoGrocers	529 Kenmy.
	-Lehenbaum, Gol	DBERG & CO., Grocers	Children and Polk.
317-	- LECOUNT BROS	Stationers, Printers, Blank Book Man	frs417 & 419 Montg.
261		Druggists	
	LEMOS SHIRT FA	CTORY L. Lemos, Prop'r	1007 Stockton.
	LEMOS SHIRT FA	CTORYL. Leinos, Prop'r	613 Kearny.
2054-	-LENNART, MRS.	E. WResidence	817 Bush.
5034	-LEVRON	The Tailor	733 Market.
5055	-LEVISON	The Tailor	323 Montgomery.
307	-LEVY, Jos. II	Jeweler	617 Washington.
6-	-LEVY, S. W	Boots and Shoes	115 and 117 Hayes.
61	-LEVY, S. W	Boots and Shoes	29 and 31 Battery.
3042	-LEWITT, WM		Office & Res. 16 Turk.
180-	-Lick House		ger. Mont. and Sutter.
152	-LICK TRUST		606 Montgomery.
315	-LIYCHTELD, L M	L & Co Merchant Tailors	415 Montgomery,
148	-LLOYD & NEWLA	NDSAttorneys	13 Nevada Block.
112	LOMBARD WARE	HOUSE Kellogg & Carvell	Lombard & Sansome.
124	-Loomis, Geo		706 to 716 Kearny.
123-	-LOOMIS, GRO	Residence	Palace I lotel.
260	-Low, C. Apolen	in & CoGen'l Commis'n Merch's	nts208 California.
107-	-LOWENTHAL, IL.	II Attorney-at-Law	4115 California.
1112	Lowny & Co		Clay & Davis.
42.	-t.nor. A. & Co.	Wholesale Fruit Dealer	5 \$24 and \$26 Clay.
102	-McAllistras &	Bergin Attomeys	38 Nevada Block.
187	-Macnosonou I		25 Market.
185	-Macrovonou I		121 Folson
81	-Macountage & C	oShipping and Commiss	ion and Sautoure
174	-Mantony & Bury	EReal Estate Agents	tot Montenmery.
177	-Matterey I II	Residence	206 Stockton
5053	Manue P	Residence	Room 128 Liek Howa
86	-Manuage E	Publisher	600 Members
86	Managem F	Publisher	arar long
6001	Manager Poor	AMINPhysicianS.	W con and & Malanda
occup.	Managara, prop	DEMING National Flour Mills	Peters and Design
		ce & Mastick, Attorneys	
144	Mastick, Dilicit	Physician	S20 broangomery.
3002	-MAXWELL, R. 1.	sr & CoGmin	135 Keminy.
24-	-MAYREW, EARNE	ST & COGmin	302 Davis.
3053	-MCDKIDE, JAS. 1	IPhysicism	raq 1 yier.
3	- otoccowa, J. W.	resulence	1323 autter.
281-	-MCCOME, GEN'L]	INOEditor, Altn & CoFashion Stables	529 Unisornia.
18	-McCord, Brings	& CoSt. Lawrence Stables	212 Sutter St.
3028-	-McDonnell, I.	IDruggist	,6th and Market.

NO.	NAME	· WUSINESS.	Logament
5023	McDowell, I	RYIN. Malanda Name	LOCATION.
14-3	ICKENNA &	GREANY Commission Merchants	Black Point.
2851	ICLEAN, ROL	ERT APhysician	. 205 Drumm.
46-2	CMERONY.	. H Batcher	603 Merchant.
99-1	ICNEAR, G.	WShipping and Commission.	Culifornia Murket.
5066-1	SCHOOLTY, L.	M. Smithing and Commission.	. 20 California,
50293	ICNUTE, W.	M Physician	Supont Res. Palace I
3055	digitaring P		808 Bush.
9001 3	Ignical Core		Eighth and Mission
2010-3	EHSE, CONNY	ANY David	Stockton & Francis
N.	ENDOCINO L.	Tatture Co. I	14 Bernard Street.
X.	ENDOCINO LA	termin Co. Co.	Beale St. Wharf.
2891	ERRILL L. C.	Residence	40 California.
289*-31	ERRULL, J. C.	& Co Commission Merchants	14 Stanley Place.
207°-M	ERRY, FAULL	& CoProvision Packers	204 California.
207-M	ERRY, PAULL	& CoProvision Packers	415 Front.
4007-M	SYER, CAPT. I	H. I. E. Paristers	Black Point.
5054°-M	EVER. E	H. L. E. Residence N.W. Eureka Nursery	cor. Webster & Cla
5069M	EVER, WA	The second state of the second	31 Gears.
9000-M	EVERS, R. C.	Druggist	39 Busli.
88M	CHELSSEN, B	ROWN & Co. Pork Packers	owell and Union.
4031	CHELSSEN, BI	town & Co Butchers and Pork Packers.	Foot of 9th.
7003-M	CHELSSEN, BI	iown & Co Butchers and Pork Packers.	908 Pront.
5026M	DDLETON & 1	ARNSWORTH, Coal.	uteliertown.
5026°-M	DILLETON & 1	ARRSWORTH, Cod	4 Post.
10611	LLER & KATC	Shipping and CommissionJ	18 Sansome.
181M1	LLER & Rienz	uch	ackson St. Wharf.
2-M1	LU, D. O		19 Commercial.
2-M1	LLS, D. O	Capitalist	undon & S. F. B'k.
75*-311	NING & SCHEN	PIFTE PRESS Devey & Co	morae,
75-A11	NING & SCIEN	TIFIC PRESS . Devey & Co	A Class
320 -311	an, P	Residence4	or City.
250MI	in, P. & Son	Millinery and Straw Goods 5	to Mark a
MO:	LERA, 15. J	W & Co. Science	28 Somments
tanh Mor	STAGOR, W.	W. & CoStoves and Tinware19	o Bettere
DIA Mar	700, C. W	Physician	2 Market
221-101	CROW, GEO		Clay.
4 m—Mos	TON, J. & C.	0Draymen	Battery.
162-Men	10%, J. & Co	Stables	is and Taylor
202-Mus	may Corre	Land Agents	Commercial.
Mos	mer Lane	X CoWholestle Dry GoodsBit	alt and Sansome
Mero	mry famous.	Physician161	3 Van Ness Ave.
227	re Dues		Clay.
344-Mur	TAL LOS CO	Laces, Embroideries, etc541	Market.
m-Myr.	Rs. German 5	357	Teltama.
m-Myr	RS. GILMAN &	Co Pacine Hox Pactory 515	Sacmmento.
49-NAIS	ITALY Report	Co Pacific Hox Pactory 515	and Harrison.
72-NAST	& GREINEY	ENRICH & ACKERMANAttorneys426	California.

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NO.	NAME.	UUSINESS.	LOCATION.
		BROSStrodard Shirt Factory	
2045	NEUSTADTER.	DAYID Residence	1016 Cutter
328-1	NEVILLE & C	O Hags, Tents, Awnings, Twins	e es California
3113	NEWBAUER.	OS Coal Dealer	not thuck
30057	NEWMAN, CA	RLTON Prom'r Glass Works	LESS Folsom
38-1	NEWTON Bao	s. & Co	204 California
0012	NEWTON, MO	RRIS Residence	1016 Tuentu Gest
1	NEW YORK L	IPE INS. CO Alex. G. Hauer. Asses	t 220 Sansome
	Atcorr	The Tailor	727 Market.
,	VICOLL		18 Keyrny
	VICOLL	The Taller	cor Montgomes
5037-1	NORMANDIE I	louse Albert Thirse, Prescriete	r 010 Stockton
1137-0	Voath Pr. Dr	FREE WAREH'E. L. W. Cox & Co.	Foot Sonrows Cr
152°-N	Tru Pr. Dr. (BAIN WARRII'S., J. V. Lavery, Supt.	Sansome & Chestnut.
5059	OCLEUS HOU	SED. Stern & Son	Third and Market.
224—N	UTTING, CAI	vin & Son Pioneer Iron Works	121-123 Fremont.
2000-0	YE, A. F	Residence	1306 California.
2040	OCIDENT SY	m.as A. Waters	Polk and Geary.
227-0	CCHENTAL I	OUNDRY Steiger & Kerr	137 First.
214-0	OCIDENTAL (RAIN WAREHOUSEW10. M. Starr. IOTELChes. L. Wetberbee, Manag	First & Townsend.
807-0	DIN RELLOWS	Association Old Fellows Building	er. Montgomery & Bash.
801-0	un Ferrows	CEMETERY	325 Montgomery.
1200	LIVER. WM	LETTS Mining Secretary Roo	Cemetery.
91-0	LYMPIC CLU	sometimes and the second section of the section of	in 13, sale Deposit Ding.
5017-0	PERA SALOON		and Beek
590	MIENTAL BOY	DED WAREN'E, Pool & Harris	Brannon and Meet
3018-O	YERLAND FRO	TRANS. CO., . C. P. R. S. Rosinks Dun	Vine Steam
115*-0	verland W	REHOUSET. W. Floyd & Co	3d and Townsend.
290 m-O	AKLAND.		
282—P.	ACIFIC BANK		Sansome and Pine.
209*-17	AC. HARREL &	KEG FACTORYOffice	408 California.
138 m—P/	CIPIC COAST	STEAMSIP CO	10 Market.
201-17	WIFIC MAIL	8. S. Co Dock	First and Brannan,
1641 0	WINE ROLL	NG MILLS	16 First Street.
20\$3m Da	CINE ROLL	ACTORYMyers, Gilman & Co.515	. Potrero.
2082 m _ Pa	CIPIC BOX P	ACTORYMyers, Gilman & Co.515	Soc. and 9th & Harrison.
29117	MIFIE TRON	Vorks Rankin, Brayton & Co	. 9th noil Harrison.
PA	CIFIC OIL A	LEAD WORKS	. 127 First.
166*-174	CIFIC TANNE	RY Kullman, Wagner & Co	. Ming bet, 20 anii 30.
146-PA	CIFIC TRANS	PER Co	145 City.
90-11/4	CIFIC VINEG.	AR WORKS L. Koster	. 222 Front
189PA	OK, MOORE	co Commission Merchante	212 Clay

			LOCATION.
NO.	'NAME.	RUSI NESS.	
3026 m-1	PAINTER, ENLEY	sDraggist	Clay and Keamy.
3012m-	PAINTER, EMLER	sDruggist	IIII nnd olisside.
71	PAINTER & CO.		rs510 City.
2033	PALNER, GRO. I	IIPhysician	424 Post-
280	Parrott & Co.	& CoTonners	300 Chilomia.
6011	Patrick, A. B.	& CoThinners	Eighteenin & rossin.
3955-	PAVILION	& CoStationers and Printers	etii Mitti Alisson.
333	PAYOY, UPHAM	& Co Stationers and Property	tar Turk
3039-	PRASE, G. M		C. Desidence Lant Setter
2031-	PEASE, R. II. JR	SHITHÆina Iron Works	ara Resented
220	PENDERGAST &	WM. A	Folsom St. Wharf.
77-	PHILLIPS, CAPI.	. W3. A	San Brown Royd
210" #-	PEST HOUSE	Druggist	Howard and Ninth.
3050	Description I	Publisher	517 Clay.
44***	Demand, L.	Poblisher	1018 Bush.
44	Berry I M		int 548 Clay.
330	Diovers Ison	WorksCalvin Nutting & Son.	121-123 Fremont.
erró	DIVIEW F M	Residence	Union and Fillmore.
126	Drum Cuas M	& Co Furniture and Carpets.	Gar Market.
1,0-	Poursy I	Tailor	203 Montgomery.
	POURIN. I	Tailor	103 Third.
70-	POLICE STATION	c	Old City Hall.
170-	Patter Station	e Harbor Police	522 Davis.
2006-	BOLLER STATION	v	Fifth and Clementina.
3025-	POLICE STATION	(Howard & Sevent'nth.
2000-	POLICE STATION	N	q61 Mission.
129	POLICE STATION	N	247 Stewart.
3019-	POLICE STATIO	N	New City Hall.
37-	Poly, HEILBRO	N & Co Butchers	339 Kearny.
7002-	POLY, HEILIRO	N & Co Butchers	Butchertown.
59-	POOL & HARRI	sOriental U.S. Bon'd Wan	en'e. Brannan and Pint.
2543-	PORTER, OFFEN	HRIMER, SLESSINGER & Co., Boots &	Shoes117 Dattery.
254	PORTER, OPPEN	HEIMER, SLESSINGER & Co., Boots &	ShoesCity and survoise.
5*-	POST OFFICE		Washing n or matery.
. 52-	POST OFFICE	Station B	1305 POR
8*-	POST OFFICE	Station C	each and Mission
8	POST OFFICE	CINNONLumber Dealers	Pier r Stewart.
	PRISTON & MCI	KINNONLumber Dealers	Descrit and Main
	PRESTON & MCI	rr & Co Union Iron Works	First and Mission.
215-	Parrieto		
5025-	PROCEST I	Physician	Office, O'Forrell & Dunont.
Sour-	Penery I	Physicianl	Residence, 418 Van Ness.
	QUONG YEE	Chinese Merchant	828 Dupont.
	Ottown Ver	Chinese Merchant	408 Merchant.
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171-	BAIMOND R. E.	Residence	1112 Stockton.
120-	RAYMOND & W	ILSHIRE Safes and Scales	215 & 217 California.
	REED, GEO. W.	Residence	1527 Satter.
4-	REDINGTON & C	Co Druppists	520 Market.

io.	NAME	HUSINESS. LOCATION.
n16-	Devices ATION	Office Louis Kaplan New City Hall.
5025	-Russ House	S. H. Seymour & Co., Prs. Montgomery Street.
298	-Saben, Jno.	Supt. G. & S. Tel. Co 222 Sansonic.
5005	-Salfield, C.	D
3053	"-Sandorn, V/	s. & Co Pictures, Frames, etc 871 Market.
330	-Sanderson (HORN, Mrs. Cigats, Imptrs., Johlses Tohacco. 327-329 Front. Sacus & Co
270	—Schweitzer,	SACHS & COImporters
270	-Schweitzer	Sacits & Co
270	*-Schweitzer,	Saciis & Co
5052	P-S. F. CHRON	LE Editorial Rooms
	C F Copiu	OAT & TRANSPORTATION CO., Miller & Enton, Agis, Jackson M. Will.
14		
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201	Scorr. II. T	

NO.	NAME.	BUSINESS.	LOCATION.
235	SCOTT, IRVING M .	Residence	con Handau
20127	revenson, Col., J.	D U. S. Shipping Com'r	118 Jackson.
212—S1	frauss, Levi & Co	haporters of Dry Goods Clting and Frashing Goods	14 and 16 Battery.
6000-T	VIOL 7 B	Gutta Pereha	501 Mutket.

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	Screau. Alemana & Blenn. Coghither. Coghithe

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5048	WENEELL, W.	r Pioneer Apothecary	852 Market."
320*-	WERNER, MRS.	RParis Millinery	708 Market.
205*-	WENT COAST I'U	ENITURE Co., Salesmoni	Second and Marke
30	AVESTERN UNIO	N TEL. CO	Pine & Montagen
214	WETHERHER, CI	ias: L Manager	Occidental Hotel.
2021-	WHARTENDY, JA	MES Residence	408 Ellis.
197*-	WHITE, CAPT.	RUSSELLFire Patrol	Stevenson.
	WHITE, CAPT.	RUSSKI.L Residence	174 Jessie.
250*-	WIIITELAW, THE	os. P. HShip Chandler	Font of Second.
250-	WHITELAW, TO	os. P. IIResidence	401 Bryant.
243-	WHITNEY & CO	S EXPRESS. Onkland, Alameda, Brook	3 and 5 Commercia
3003	WHITNEY & WE	USTER Wool Warehouse	Kiner St
2022	VHITNEY, J. P.		Loren Statter
,	VIIITNEY, I. D.	Physician	and Sutton
,	VHITNEY, J. D.	Physician	Lick House
1061	A'IENBR, E. O	S. F. Steamboat and Transportation Co.	Jackson St. Wharf
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3006-V	VINTERHALTER,	WResidence	1430 Tyler.
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30001	vood, F,	Residence	. 2923 Sacramento.
184*-4	ATES & CO		113 Pront,
220 Y	ATKS, R. R		elle Market
184-Y	ATES & Co	Oil Warehouse	att Male
2	ELNER, WM	Druggist	5th and Mission.

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NAPHTALV, FREIDENRICH & ACKERMAN	411½ California.	
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MCNULTY, J. M.	118 Durant	*** ** **
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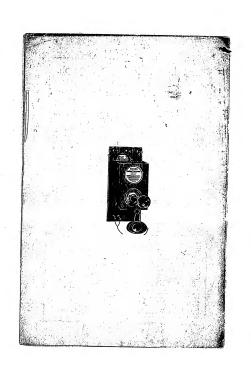
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For example: "Hello," "Good morning," or "Good crening."

For example: or Chaile Foster wants to, or Those Eving,"

White Exchange is finding party wanted the caller will be disconnected temporarily, and we are not responsible for delays at this point. White patients was the proposed of the pr

can not be rung from Exchange when switch is open. Always speak slowly and distinctly, in a moderate and natural tone of voice. When Cental Office calls you, do not press buttoh in answer. Simply take Telephone from switch and ask what is wanted.

When through conversation, replace Telephone on switch and always press the button three times for disconnection. A neglect to notify us may delay your own business as well as ours, through parties being told you are engaged.

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Your Instrument should be placed in a locality from where the bell can be heard at all times, and when parties retire for any length of time from place of business or residence, the Exchange and your correspondents will be accommodated if you advise us as to the hour of retiring and return.

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520 Fritch, Ningen & Co Third near St ct-i-	All hours.
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316 Peel	c & Ritchie, Patent Linwyers, office, c 3d st 1 30 to 5 30
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		4 n Mnin st	6 00 to 9 00
309 Reed	i, J Lane & Co,	Plow Works, Front st	7 00 to 12 00 1 00 to 6 00
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332 St Jo	hn Machine Offi	k, cor Third and Jeffersor in st	t, 7 oo to 10 oo
234 Schei	ihenzuber, Dr, O	ffice, e First st	2 00 to 3 00
314 Thre	sher & Co, Office sher & Co, Varn nson, H C, Groc	sidence, e First st , e Third st , ish Factory, e Car Works er, 34 e Third st on st netory, e Hydraulie	. 7 00 to 5 30 . 7 00 to 5 30 . 6 30 to 8 30
514 US 1 228 Unio 123 U B 337 West 116 West	Exp Co, e Third n Pass Depot, w Publishing Hous ern Union Tel C ern Union Tel C	st. Sixth st e, eor Main and Fourth o, s Jefferson, Public Line o, s Jefferson, Private Line ird st	. 7 00 to 6 00 . All hours. . 7 00 to 6 00 . All hours, . All hours.
205 White	more Bros, eor V	Vater and Foundry	. 7 00 to . 7.30

LIST OF SUBSCRIBERS 7 00 to 12 00 304 Whitesides, Dr, office, Huston building 1 00 to 6 00 7 00 to 9 00 408 Weidner, J & P, e Fifth at 7 00 to 12 30 320 Water Works Office, City Building, room 7 . . . 8 00 to 12 00 2 00 to 5 00 241 Wood, C B & Co, Third and Clinton 7 00 to 12 00 1 00 to 6 00 24 Whitmore, J. D. Wayne at and R. ROrossing. 1 00 to 6 00 244 Whitmore, J. D. Wayne at and R. ROrossing. 1 00 to 6 00 442 Walker & Walker, Third bet Jeff and St Olair 3 00 to 10 00 424 Young & Young, I O O F Temple. 3 00 to 10 00 407 Zeilers, Abia, n Main st 7 00 to 9 00 The following named persons have ordered Instruments, and will be connected with the Central Office very soon: MARIE. MARIE TA & CAN WAS A SHARE THE WAS A S NAME. LOCATION. BUSINESS HOURS. 7 to 6 p m

	D-10011 1-0111 11011-0 -110		•
Name.	Location.	Bu	sinese houre
Clare lessoh, Residen	ce cor Fifth and Jeffereen, s, D II & C C Morrison, Proprietee and Residence eee Oak and Jery, St. Mory's st. st Fifth at. Page Fifth at.		All Hours.
Columbia Bridge Work	s, D II & C C Morrison, Proprieter		All Hours
Cohan John, Grocery	ted Residence our Oak and Jny,		An noire
Doentsisch, Livery Es	at Fifth at.		
D&SK Round House	l.		
Dayton Savines Bonk.	Rost Fifth et.		
Dayton Insernace Co.	eor Third and Jefferson.		
Daytus Hedga Co, Off	ice, Third and Perry,)	8 to 12 m.	1 to 0 pm
Excelsior Oil Works, 8	26 East Third st.		
Gehhart S & G, West	Phird st.		
German Al. Sil West	Third at.		
Gelhart Alex, Wayne	at and it R.		
Hoffman Wm. Office F	nce summit se.		
Hungarey A, Resider	ee Mal'herson.		
Helden Geo, Residence	a First st.		
Hoffman W H, 1023 Ea	st Fifth at.		
Hannah Bros, 321 East	Finist.		
Klees John, Bettling V	Vorks First and Canal.		
Lowis II W & Son, III	Enst First st.		
Love Co. J G. Ressies	re Dayton View.		All Hours
McSherry D K & Co.	Third and Clinton,		7 t0 6 p m
Miller M. Store Dayton	View.		
Mayors Office, Sixth at	d Tecumseh.		
Mend C & Residence	I Fost First et.		
Miller August, Store V	nyue and Adams,		5 to 11 p m d to 7 p m
Morrison D. H. & C.C.	d stid Dutor. Druden thritding		0 t0 7 p fts
Mulford Smith & Bradl	ey, Proden Boilding,		7 to 9 p.m.
Noise M P, Office Thir	d at Cleggs Hock.		
Nash R Jr, Residence	227 East Water at.		
Owen Picity & Co. Sto	re Third bet Main and Jelierson.		
Parrett Cel E, Residen	ce Oakword,		
Parrett Geo & Chas. O	fice Upper Hydraulic.		
Patterson & Co, Yard	Third and Kenton.		
Peters Wm, Yard Clint	on st.		
Painer A O. Residence	21 Bridge st.		
Pruden David, Residen	see Mound and Third.		
Ropers R. A. Procesey T	hird and Canal.		
Reiser Powell, Grocery	1128 Wayne st		130 to 7 p m
Staddard I W. Residen	ce Duyton View.		COO CO 2 p III
Steward & Conklin, Mr	in near Second.		
Sarla & Pruden, Drue	giers Third and St. Chair.		
Spencer Ed, Store 1772	Third and June,		5 to 11 p m to 5:30 p m
Schalbenruber Dr. Res	idenet South Wayne st.	,	to accor p m
Station House, East SI	ath st.		
Se John A. Residence	Linden ave near Third.		7 to 6 p m All Hours
Taylor II C, Factory 22	West Pifth st		7 to 6 p m
Trentman C A, Spice P	Allis cor Barr and Duton.		7 to 8 p m All House
Wolf Bros, Residence	St. Mary's,		All House
Webster W. W. Reside	nee 125 South Ludlew st.		All Hours
Walten A, Undertake	Franklin st.		
Woodsum Machine Co.	Kowee and Pitts.		7 to 6 p m
White W ft, Stable 33 I	ast Fourth st.		
Wight C & Son, Yard V	Vest Side Third RtR crossing.		6 to 7 p m 6 to 7 p m
Wight C, Residence 23	West Second et.		
Zeller Able Residence	Wilkleson her Frunth and Fifth.	8 to 12 a m	1 to 5 pm
Zeil J S, Dentiet East J	lith st.		
Zill and Hauser, Mark	and produces are Oak and Jury, 1975 and Jury, 1975 and 19		

EDISON TELEPHONE EXCHANGE.

Classified List Edison Telephone Exchange.

Attorneys and Solicitors

Brown, O. B., ry e Third z.

Bolith & Shande, rev Jains and Second sts, Eaker building.
Bolith & Shande, rev Jains and Second sts, Eaker building.
Bolithin, W | & J|, No. 6 s J. Main at.

Bolithin, W | & J|, No. 6 s J. Main at.

Bolithin, W | & J|, No. 6 s J. Main at.

Bolithin, J. J. Lander, J.

Beaver, Leon, cor 5th and Main, Pruden's Building. Peters & Burns, s Jefferson st, Clegg's Building. Bakeries.

Baumn, A L w Third st.
Heathman, G W, & Co, cor Second and St Clair.
Wystt, H & T, 136 e Second st,
Banking Houses.

Dayton Savings, 432 e 5th st.
Gebhart, Harman & Co. 3d nr Jefferson.
Merchants National, 3d and Jefferson.
Second National, 3d and Jefferson.
Book Stores.

Rickey, James, 28 n Main st.

PRISON TELEPHONE EXCHANGE.

Bagging Factories.

Gebhurt, Josiah & Co, cor sd mad Front.

Citchifuers and Cloth Houses.

Legter, Barlow & Co, dry goods, notions and cloth, Main near sd.

Barlow Codnie House, sd st nead Eds.

Evernole & Rice, and the House, sd st nead Eds.

Evernole & Rice, and as bet Main and Jefferson.

Over, Pitripk & Co, gd st let Main and Jefferson.

Haller & Lyons, Main a near market house.

Confectionery, Fruit and News Dopots.

Onnoctionery, Fruit and News Deposihaderon, Case, Commission House, this tear Jefferson. Realize Trans. Commission House, this tear Jefferson. Gray, F. H., Third at, near Main. Work Thou, Third at near Main. Work Thou, Third at near Main. Work Thou, Third at near Main. Wilson, Cite J. O News Depol. or ath and Jefferson. Free Telegraph Office. Telegraph Office.

Zoll & Houser, Market st.
Cox, John G, 4th st near Jefferson.
Johnston, Sam, Main st between 3d and 4th.
Contractors and Builders.

Brown, S N& Co, s e cor 4th and St Clair.
Beaver & Butt, St Clair bet 3d and 4th.
Rouzer, John, Wyandott st.
Pierce, J H & Co, cor Wayne and State.

Pierce, J H & Co, cor Wayne and State.

Commission and Brokers Offices.

Bates, W L., Journal Building.
Cox, J C., Huston Building.
Mett, F B, Huston Building.
Todd, W D, 12 s Jefferson.
Coffee and Spice Mills.

Canly, E, gos to gos w Water st.
Trentman, C. A. cor llar and Dutoit.
Commercial Collectors and Insurance Agoncies.
Dayron Insurance Co, Heston Building.
Dennis, G. B. & Co, Main bet ad and 3d
Trienans Insurance Co, Jeffernon at the t of and 3d.
Ohio Insurance Co, 3d in Jeffernon.
Worman, C. Jeffernon at m Touoffice.

Worman, C, Jefferson at nr Postomec.

Churches.

German Reform Church Study, Rev Win A Hale pastor, n Ludiow.

Dentists.

Hubbard, L & H, Pruden Building, 5th st.
Tizzard, S B, Jefferson nr 5th.
Whiteside, A T, e 5th nr Brown.
Zell, J I, 6 e 5th st.

Abbey, James, a6 s Main st.
Dixon, Geo M., or Main and ad.
Dixon, Geo M. and st near Main.
Fretzinger, R & Bro, Third at inerr Jefferson.
Seelis & Preden, s e cor 3d and St Clair.
Walters, J B, n w cor 3d and St Clair.
Walters, J B, n w cor 3d and St Clair.
Vallers, Abin, u Main st.

Dry Goods Houses. Daneyger & Son, 106 c 3d st.
Parmely, M B, 114 and 116 c 3d st.
Sharpe's Trade Palace, 14, 16, and 18 c 3d st.

Foundry and Machine Shops. Foundry and Machine Shops.

Barkey Sainh MgC on Refore Main Grant Buckey from and Brass Works, Third and Canal.
Buckey from and Brass Works, Third and Canal.
Buckey for McMarkey Market at the Market Market Buckey & McMarket Market at the Market Market Market Buckey & McMarket Market Marke

Broadrup, Huffman & Co, Mfrs Office and School Furniture, eor Bayard and Prairie. Callahan, W P, e Third st. Columbia Bridge Works, D H & C C Morrison, office cor 5th and Main, Pruden building.

Grocers-Wholesale and Retail.

Reizer, Powell, 1128 s Wayne st.

Reizer, Powell, 1128 s Wayne st. Spencer, Ed. 20e 3d st. Thomson, H. C. 3d bet Main and Jesserson. Whitten's Central Stores, e 5th bet Main and Jesserson. Gun Stores.

Dodds, James, 17 s Main st. Schneider, C E, 35 s Main st. Galvanized Iron and Cornice Works. Bretch & Evans, 3d st near Canal. Buvinger, G W & E E, 3d st near Canal. Germann, M, 344 w 3d st.

Hides and Scrap Metal. Raugh, E E Son, Third at near Canal. Blau, M, on Canal near Third.

EDISON TELEPHONE EXCHANGE. Hardware and Iron.

Rogers, Engle & Co, n Main st.
Barnett, R & Co, Wayne at near 5th.
Rohr, Geo F, Third st near Main.
Gebaart, S & G, Third and St. Clair. Hotels. Diekey House, oor 6th and Ladlow. Phillips House, cor 3d and Main.

House Furnishing Goods. Stewart & Conklin, Main ur 2d. Jewelers and Opticians.

Best, W H & Co, cor Main and 3d. Knife and File Makers. Simmons, A. A. Dayton View Hydrautic.

Clark & Co, e 2d st near Canal. Lumber Yards

Diekson, W B & Co, 1st and Sears.
Davis, Sam, 5th and McDonough.
Gebhart, Alex, Wayne at Crossing.
Honk, M J, Wayne nr 3d.
Peters, Wm, Clinton nr 3d.
Wight, C & Son, Branch w 3d st R R Crossing.
Wight, C & Son, Branch w 3d st R R Crossing. Livery Stables.

Cathcart, Jas, Jessens at opp Market House.
Dempacy, Jas, 3d nr Wyandott.
Dornbusch, gidn ir Wayne.
McGowen, Peter, Main so of sth.
Mesier, P. P., 3d st nr Phillips House.
McGowen & Lakue, 4th bet Main and Jessenson.
McGowen & Lakue, 4th bet Main and Jessenson.
McGowen & Lakue, 4th nr Jessenson.

Laundries. Bowden, J A & Co, 2d nr St Clair, Mills and Milling Supplies.

Gebhart, S & Sons, eor 3d and Front. Gebhart, J R & Son, eor 3d and Canal Weed & Co, Jefferson nr 3d. Telegraph and Express Offices.

W U Telegraph, Jefferson nr 3d. U S Express American e 3d nr Jefferson. Manufacturers of Cigars and Dealers in Tobacco.

MARIAURAGUITOFS OF CIGATS AND I Cotterill, Fenner & Co., 2d nr Jefferson. Hannah Bros, 5th nr Brown. Powell, Chas L & Co., 5 e 2d st. Wolf, J P & Co., 1st and Foundry. Warman, C, 707 s Jefferson st. Wollaston, J & Co., 3d nr Main.

13

Meat Stores. Jacobs, Harry, 385 w 3d st. Jacobs, N & C & Co, Market st. Miller, August, 918 s Wayne st. Olt, M, 22 Market st.

Manuf'rs and Dealers in Varnishes, Paints and Oils.

taliti To anti Dobaers in Varinisios, Fa. Clegg, Wood & Co, Wyandott and 4th. Thresher & Co, Third st near St Clair. Tower Varnish Co, 1250 c 1st, Class Tower, pres. Lowe Bros. Third st near St Clair. Excelsion Oil Works, 326 c Third st.

Manufacturers of and Dealers in Paper Goods. MARIUIACUIPER OI AND JPERIORS IN PARIBURGA CRUBE & CO. or 11 and St Clair.
Holden Manufacturing Co. c 2d st near Main.
Mead & Nixon, a Main st, Med Hail building.
Mead, H E & Co. 19 e Second st.
Wixon, Thos. 21 6 n Main st.
Rogers, R A, & Co. 119 e Third st.

Manufacturers of Agricultural Implements.

Manufacturers of Agricultural Implement Reed, J. Lans & Co., a Front it are Third. Reed, J. Lans & Co., a Front it are Third. Market Reed, J. Lans & Co., a Front it are Third. McSherry, D E. & Co. or Halburdge and Third. McSherry, D E. & Co. or Manufall and Pine, Market Reed, Co. for Manufall and Pine, Market Reed MgC, Co. & Kowce. and Pitts. Farmer. Friend MgC, Co. & Kowce. and Pitts. Farmer. Friend MgC, Co. & Kowce. and Pitts. And Co. & Kowce. And Pitts. And Co. & Kowce. And Pitts. And Co. & Manuf'rs of Soda Water & Vinegar.

Klees, John, cor 2d and Canal. Offices for Coal and Wood Yards. Offices for Cond and Wood Yan Conve & Haydon, Vard Sixte 1st Filled, Davis, 1, Yard shi st R R Crossing, Davis, 1, Yard shi st R R Crossing, Davis, 1, Ward on Walled and Paris, 1, Handel Cond. Offices, 93 to 90 McDenough. Marphy, JA. Branch Office, Jeffernes at at Beckel. Narphy, JA. Branch Office, Jeffernes at at Beckel. Paris, 5, 1, 184 shi and Williams, 184 shi and Walled Marphy, JA. Branch Office, Jeffernes at at Beckel. Parisers, 5, 1, 184 shi and Walled Marphy, JA. Branch Office, Jeffernes at at Beckel. Parisers, 6, 2, 184 shi and Walled Mary, 184 shi and 18

Millinery and Notions. Babbitt, T S & Co, wholesale, n Main st.
Griffith Bros, wholesale, e 3d st.
Smith, Mulford & Co, wholesale, Praden building, 5th st.
Hillman, C, retail, Temple of Fancy, 448 e 5th st.

Public Offices and Schools.

County Clerk, Court House, City Clerk, City Buildings, City Hospital, Franklin nr Ludlow, City Infirmary, Brown st opp Union. City Houghal, Franklin ar Loudov.

City Hompial, Penaklin ar Loudov.

City Intimary, Favors to oper Times.

Police Office, City Building.

Water Works Office, City Building, Count Building, Count Building, Count Building, Count Building, Main st.

Oley Montal County Library, 3d st adjoining Superior Court.

City Board of Education | City Buildings, Main st.

High School, or Wilkinson and 4th.

Wormal School, Huffman are bed shay and Courts.

Normal School, Huffman are Water Stay and Courts.

Normal School, Huffman are bed side and Franklin.

Frouth Duriet School, Ladow side ted than af Pranklin.

Frouth Duriet School, Huffman are Hown.

Seventh Dirict School, Huffman are Hown.

Seventh Dirict School, Huffman are Morn.

Tenth Duriet School, Huffman are are Malin.

Tenth Dirict School, Huffman are are Malin.

Tenth Duriet School, Huffman are are Malin.

Tenth Dirict School, Huffman are are Malin.

Tenth Dirict School, Huffman are are Malin.

Physicians and Surgeon Physicians and Surgeons.
Ackelon, Dr. cort and Judiov.
Jennings, Dr. Wilkinson st between ad and 3d.
Jeveth, Dr. Jedictors at bet ad and 3d.
Jeveth, Dr. Jedictors at between ad and 3d.
Jeveth, Dr. Wilkinson st near ad.
Rickey, Dr. con st, and Brown.
Schielenauber, Dr. ist, at next Main.
Webster, Dr. W. 127 a Luddow st,
Webster, Dr. W. 127 a Luddow st,
Webster, Dr. W. 127 a Luddow st,
Dugherty, Dr. cort st. aug. ann. In Gallawias.

Photograph Galleries. Bunker, P, cor 4th and Jefferson. Miller, C H, Main bet 4th and 5th Provision and Feed Stores. Miller, Mike, Dayton View. McCausland, W J, 3d and Canal.

Plumbers Gibbons & McCormick, Jefferson st near 3d

15

Parent Bestlen, On wood.

Parent Bestlen, On wood.

Reed, J Lane, Jeffernon st.

Reed, J Lane, Jeffernon st.

Soddard, J Ways St.

Soddard, Power St.

South St.

Swarts, S.

Swarts, S.

Swarts, S.

Francis, S.

Swarts, S.

Francis, S.

Swarts, S.

Wight, G.

Jog Warres at.

Wight, G.

Jog Warres at.

Wight, G.

Wight, S.

Wight S.

Wi

Wolf Bros, St Mary's st. Webster, Dr W W, 125 s Ludlow st.

Real Estate and Ticket Agencies.

Bellows, 3d st, Huston Building. Fellows & Bragg, w 3d nr Phillips House.

Railroad Offices and Depot.

A & G W, J Hardy, agent, freight office, 1st and Keowe st. Alexander, G M D, agent S Shore Line, n Main st. C C C & I, B F Hargrave, agent, cor Caruell and Water. D & M and C H & D, Lewis Cassell, agent, freight depot

D & M and C H & Cl, Levis Cassel, agent, reight depon a c D & U, Chank B Milker, agent, reight office or Parisi and D C & T R & Offices, ore pit and Main, Pruden building. D & S B, B P Prury, agent, ever pit and McDenough. D & S B, B P Prury, agent, ever pit and McDenough. D & S B, B D House, and D B Prury agent, a pit and building. D & S B Hoist, n s sist st of Kowree. D & S B Hoist, n s sist st of Kowree. D & S B, Hoist, n s sist st of Kowree. D & S B, Hoist, n s sist st of Kowree. D & S B, L S B, L

Sewing Machine Offices. St John, Chas Baird, agent, w Third st, near Main. Saw Manufacturers.

Lewis, B W & Son, 411 and 413 e 1st st. Stone Yards.

Brice, S T, Wilkinson st and Union Depot. Huffman, Wm, e 5th and Huffman ave. Webber, L H, Jefferson st opp Buckeye.

Wholesale and Retail Liquor Dealers,

Beckel & Pohlmeyer, 5th and Brown. Fritch, Nipgen & Co, 3d nr St Clair. Fletcher, J R, cor 5th and Brown. Kern, Philip, 5th opp Stone st.

Printing Establishments.

Croy, McFarland & Co, cor 6th and Main. Croy, McFarland & Co, cor 6th and Main. Journal Office, in Main st. Reynolds & Reynolds, cor 2d and Jefferson. U B Book Store, cor Main and 4th. Walker & Walker, Third st near St Clair.

Queensware.

Fox, C E, 3d st near Main,

Residences. Cohan, John, cor Oak and Jay. Daneyger, St. Marys st. Echwright, Capt F, 131 Commercial st. Freeman, W.D., s Wayne st.

Freeman, W. D., s. Wayne st.
Gebhart, Geo, s. Wayne st.
Gimperling, J. E., cor and and Webster.
Gaddis, The Summit st. Miami City.
Humphreys, A., McPherson.
Hugher, R. D. 22 Bridge st.

Id

Wholesale and Retail Liquor Dealers.

Microsane and Astan Enqu Murray, Chas, Jefferson in 4th st. Renolds, J. 5th and S. Clair. Rity, Jas. Main in 3d. Sanders, W. 3d bet Jefferson and St Clair. sanders, W. 30 bet Jenerson and Sc Can. Sanders, Gus, 3d bet Jefferson and St Clair. Sanders, A, Jefferson nr Market. Stevens, A, Ladlow and Eaker. Weidner, J & P, 5th opp Montgomery. West, Wm, cor 5th and Jefferson.

NOTICE.

Subscribers must not, under any circumstances, disturb the bauery or Subsenders must not, under any circumitances, custurb the battery of connections, or altered to adjust their Instrument in any particular. connections, or attempt to adjust their instrument in any particular. This work is assigned to experts, who will wait on you as soon as I'ms work is assigned to experts, who will wait on you at soon as possible after receiving intelligence that your Instrument needs adpussause airer receiving intelligence that your instrument neets activities, and you will do us a very great favor by reporting promptly

ver some other line any continued troubte.
We have a large force of operators, who are recommended for inover some other line any continued trouble. telligence, activity, nationee and gentlemanly deportment. The fretetingence, activity, patience and gentiemanly deportment. The irequent occurrence of an avalanche of signals prevents immediate an quent occurrence of an avalanche of signals prevents immediate answer, or may for the moment ruffle the temper of an operator and cause swer, or may for the moment ruline the temper of an operator and cause an apparent ill-natured remark to an impatient caller. Parties must an apparent ul-natureu remark to an impatient cauer. Fatues must make due allowance-for this, and report evident inattention, ungentiemake use anowance for this, and report evident mattention, ungentiemally conduct, or improper language indulged in over the lines, which

vil command immediate attention.

We are at all times disposed to allow the privilege of conversation. will command immediate attention. we are at all times disposed to allow the privilege of conversation with the Exchange to satisfy mere curiosity, but request it will be done

a moneration curring business nours.
Our long list of subscribers, including the Courts, Public Offices, in moderation during business hours. Our long list of subscribers, including the Courts, Fublic Ollices, Law Library, Infirmaries and School Houses, with the established fact Law Labrary, immearies and school riouses, with the exabisined fact that the bulk of important business is done over our wires, attests the

that the buts of important numers is none over our wires, attens the value of the Edison Telephone, and establishes it as the favorite. The hours for business furnished by most subscribers at our request, The hours for business turmshed by most subscribers at our request, will answer many inquiries, and prevent many ealls that can not be

nswered. Our arrangements at the Water Works Pemping House give us every Our arrangements at the Water Works Pemping House give us every advantage for fire alarms, without the confusion and damaging effect anyantage for fire alarms, without the confusion and damaging effect produced by connection with each hose house over the fire alarm poles

and wares. Subscribers are at liberty to send in calls over any line within their Subscribers are at inserty to send in caus over any ane within their reach, when away from their own, by consent of subscriber to whom and wires

reaca, when away from their own, by consent of subscriber to whom they apply. Business men will understand the mutual advantages of ns pian, and need not be imposed upon. We have made a permanent arrangement with the celebrated Italian this plan, and need not be imposed upon. We have made a permanen arrangement with the celebrates italiand. Band or Quintette Club of Harpitts and Violinits, connecting the practice room to the Exchange, for the entertainment of our subscribers.

during evenings when the band is not otherwise engaged. Exchange or Central Office open day and night. Instruments will be supplied as fast as we can obtain them by ex-

press from the manufacturers.

Revised lists will be issued on the first of each month. G. W. HOGLEN, Manager. READ THIS PAMPHLET

CAREFULLY



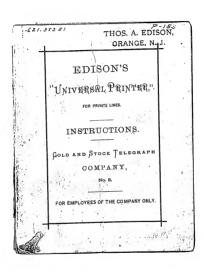
Governed by its Instructions!

WHEN BOY IN USE KEEP IN SIGHT NEAR THE INSTRUMENT.

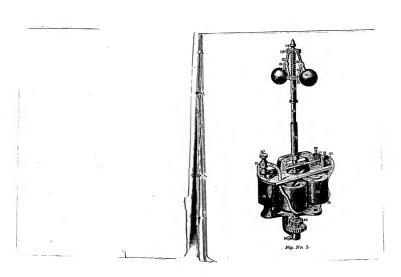
Gold and Stock Telegraph Company

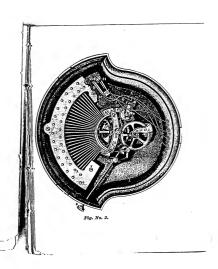
This folder contains printed material issued by the Gold and Stock Telegraph Company. Organized in 1867, this company furnished gold and stock price quotations by telegraph.

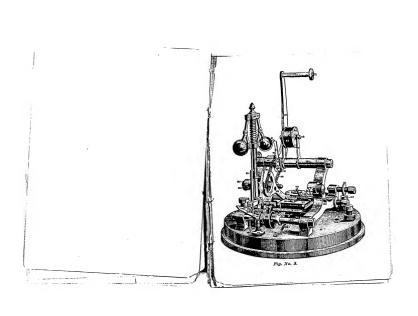
The following item has been filmed: "Edison's 'Universal Printer' for Private Lines. Instructions" (ca. 1871-1873).

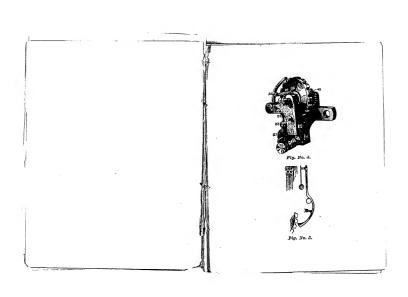


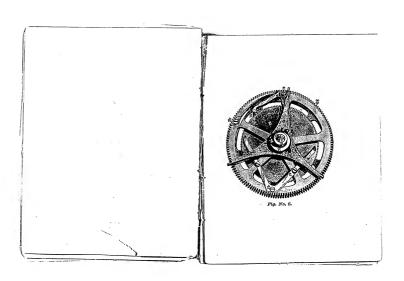


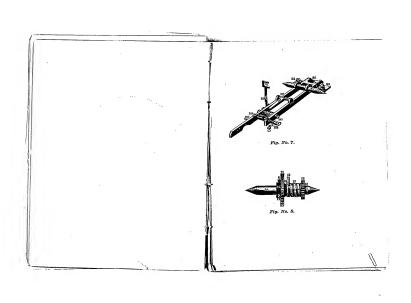












EDISON'S "Universal Printer," FOR PRIVATE LINES. . INSTRUCTIONS. GOLD AND STOCK TELEGRAPH COMPANY, FOR EMPLOYEES OF THE COMPANY ONLY.



This instrument works upon one line wire. It

This instrument works upon one in the 22 performs three operations, to wit:

The rotation of the type wheel, the correction of the type wheel and the impression of the letter.

The instrument has two distinct mechanisms the transmitting and printing devices.

Electric Engine.

The transmitting devices, consisting of the main break, stop pins, etc., are driven by a small electric ongine, run by a local battery. The transmitting devices are detached from the engine while in motion by the depression of any

key of the keyboard. The engine is provided with a governor, by which the speed of the instrument can be increased or decreased, and every instrument in a circuit made to run exactly alike.

The Instrument.

The instrument proper is similar to the stock opporting machine, with the exception of a vibrating contact point, operated by the ecspenoms to lever, which open and closes the local printing circuit. The printing lever is operated by a magnet placed in this local circuit, instead of being placed in a second main circuit, as is done in the stock reporting instrument. The vibrating point is go arranged that the local printing circuit is obsect when the main circuit is open.

Magnets.

One magnet, with an armature and forked lever acting on a toothed wheel, gives motion to the type wheel step by step. This magnet is placed in the main circuit, and is called the type wheel magnet.

Another magnet is placed in a local circuit, which circuit is opened and closed by a vibrating contextspring on the escapement lever. Owing to the rapidity of vibration, the local circuit is not closed long enough to allow the magnet to ohargo and

UNIVERSAL STOOK PRINTER.

move the printing lever; but if a key is depressed the vibrating point stops and closes the local cicuit, which allows the printing magnet to become charged, and the printing lever is thrown up to the face of the type wheel. The printing magnet is operated by a separate local battery.

The two magnets which operate the electric engine are called the engino magnets.

Description of the Engine.

Fig. 1 shows the engine and its connections. The break spring, 168, is made to vibrate between two contact screws in 164, by a small cam upon the engine shaft, 168. One contact screw is connected to one pair of magnets, and the other contact screw to the other pair.

The other ends of hoth magnets are connected to one pole of the local battery, and the spring. 1638, to the other end. 178 is the revolving armature secured to the engine shaft, 168, by a collar and set serew. This revolving armature and contact spring are so adjusted that the circuit is thrown from one pair of magnets to the other. When the revolving armature is nearly over the

cores of the magnets, by throwing the circuit alternately through the two pair of magnets a constant rotation of the engine shaft is obtained. The serew, 188, holds the cup shaped centre, in which the point of the engine shaft runs.

This centre is made to hold a small amount of 1.86 is the stating method, which is is sometimes necessary to use to give an initial sarrt to the engine when the battery is switched on, the revolving smalters having a magnetic centre. To sarm 7 (see §2, extending out through the base, is pushed in to give this motion. 165 is the augine gaw whoel, secured to the engine shaft by the seew and colin, 184. This gear wheel (see 18,2 s) is connected to the transmitter gear

No. 157 is a sleeve with a small rim at its lower extremity. It is secured to the cross piece, 156, and governor arms and balls, the whole rising as the speed of the eagine shaft increases or decreases.

The bent wire, 97 (see fig. 3), is the device for regulating the speed. This arm is secured to and insulated from 99 by the rubber bushing, 98. To the lower end of this regulating rod is secured the

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insulated wire, 141. This rod may be mised or lowered by the screw 101. The extreme end of the rod'is bent over towards the sleeve and flange, and, as the governor balls spread out, the flange upon the sleeve comes in contact with the bent portion of the regulating rod; when this occurs the engine battery is "cut off" from the magnets or "short circuited." When this contact takes place the speed decreases, the governor balls drop, and the short circuit is broken and then quickly made again. It is obvious that the position of the rod, 97, will determine the speed of the engine. By referring to fig. 1 it will be seen that the contact spring, 163, is not insulated from, but in connection with the whole frame of the engine. One end of the battery is connected to the frame, and the arm. 97, to the other end of the battery, hence a connection between the end of the rod, 97, and the flange on the sleeve, 157, forms the short

The contact points in the rubber piece, 164 (fig. 1), should be cleaned every two or three months; but bad contact will not prevent the engine from running, as a failure to make connection in one part of the revolution will be compensated for by

the mementum of the governer balls, which will carry the shaft around to the next centact.

The contact spring, 168, sometimes breaks at the point where it is connected to the brass plate, 161. In this case replace by a new one.

The win, 141 (see fig. 9), as use, we have the search and the regulating red, 70, by a small be leading red, 70, by a small be red, 100, whost turned is smell a position that this small reservation of the red of the

The Main Break.

Fig. 4 shows the main break; 49 is the main break wheel, having thirty teeth.

Upon the same shaft with the break wheel is a small gear wheel, 48, which is used to connect the UNIVERSAL STOOK PRINTER.

main break with the centre wheel of the instrument; 54 is the main break lever. (See fig. 5.) A vibratory motion is given this lever by the teeth on the main break wheel.

Upon the extreme and of this lever are two phints points; in front of these points are two flat weaks printing secured to a stud, 65; on the actrono cales of these aprings are two platins points facing those on the lever, 64. One spring is set slightly in advance of the other (about the thickness of a piece of paper). The two springs are significant from the sum, 64, and are connected through a lobe in the base, the other cold of the through a lobe in the base, the other cold of the through a lobe in the base, the other cold of the property wheel magnetic being connected to the line by the wire, A4, and binding post, 36.

The arm, 54, and all other portions of the main break are connected by the wire, D, to the binding post, 29, and thence to the main hattery and ground.

It will be seen that the main line circuit, within which are the type wheel magnets, is opened and closed by the double platina points. The reason for placing one of the platina points a little in advance of the other is that when the cir-

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cuit is broken the spark almost always comes on the point which is set in advance. This keeps one point clean and unoxidiscal. The point which takes the spark fails to connect about once in every thirty revolutions of the type wheel, but the other point causes the connection and prevents the type wheel from throwing behind one letter. As this point does not review many sparks, it will be several weeks before it will be the most fine camera and the contract of the them used fine camera paper, and be careful not to their adjustments, in a very alight always with the contraction of the contraction of the broak, and interfere with the adjustment of the type wheel.

In receiving a message, the main circuit is prevented from opening at the double phints points by two extension wires, F and G, running to the switch spring holder, 20, and slant, 23. The two writch springs 21, are included within the origine circuit, so that, by turning the slant, 23, the engine circuit, so that, by turning the slant, 23, the engine circuit can be opened and cleave.

There are two brass pieces, 23, inserted in a hard rubber collar on the switch shaft. When the switch is turned, to transmit a message, the springs, 21, connect nector the huma piece and close the engine circuit, which, in its turn, starts close the engine circuit, which, in its turn, starts taked. At the same time type "extend" on the taked. At the same time properties of the same time that the same time to be a surface of the properties by the springs shifting off of the horse piece, 28, on to the hard rubber. These brass pieces and contact springs chentle be kept clean, to obtain perfect connection, otherwise trouble will occur citize by the engine circuit or main circuit openiture.

Fig. 6 shows the centre gear wheel. Upon the shaft, 38, are two gear wheels, 38 and 34, and a ratebot wheel. S2.

Things wheel, 32, mul ratchest wheel, 32, are secured firmly to the shaft, 38. The wheel 34 is agreed into foos fig. 30 the wheel 31, and thence to the origine shaft. The wheel 33 is loose upon the shaft, and the shaft of the

lever rotate in the path of the finger key arms. The main break (see fig. 4) is geared into the loose wheel, 33.

The manner of detaching the main break from the engine mechanism while in motion is very simple. If a key is depressed, one of the ends of the stop piece, 31, comes in contact with the key arm and arrests its forward motion. The click, 89. is lifted out of the ratchet wheel, and the gear wheel, 33, and main break (see fig. 2) are stopped, while the engine and its gear wheels continue in motion.

The stoppage of the main hreak, of course, prevents any further interruption of the main curreat; the type wheel is stopped; the vibrating point upon the escapement lever closes the printing circuit, and the letter is impressed upon the

If the finger key is raised, the click, 39, falls into the ratchet wheel, 82, the wheel 88 and main hreak are locked to the engine mechanism, and are carried around until another finger key is de-

The spring, 35 (fig. 6), is used for the purpose of providing a slight friction between the mechan-

ism which is stopped and that which is rotated, to prevent a rehound of the former when it is suddenly arrested, and also to ensure the raising of the click, 39, promptly. In carrying the instrument care should be taken

that none of the mechanism underneath the base is displaced by the arm or hand.

All the hearings of the engine mechanism should be oiled occasionally.

The Type Wheel and Printing Mechanism.

Figs. 3, 7 and 8 show the type wheel and printing mechanism. Fig. 3 shows the instrument with the type wheel and printing lever taken out; fig. 7 shows the printing lever, and fig. 8 the type wheel. 86 (see fig. 3) is the unison arm; a pin, 87, on the end of this arm runs into the worm or screw, 67 (see fig. 8). 98 is a spiral spring, which holds the unison arm down to the worm. 201 (see fig. 7) is the unison tripper, the arm, 86, passing through the slot, 201, so that hy the raising of the printing lever the unison arm is thrown out of the worm and placed back to the ratchet

wheel, 66. Upon the worm near the type wheel is a stop pin, 68, which, coming in contact with the square ead of the unison arm, 86, blocks the further progress of the type wheel. The shaft which carries the type wheel must make three revolutions before the worm will bring the unison arm up to the stop pin, 68. When the type whoel is blocked the escapement lever continues to vibrate until a finger key is depressed. If the first dot key on the extreme left is depressed after the type wheel is blocked, the vibrations of the escapement lever will cease, the printing circuit will be closed, and the printing lever will throw the unison arm away from the stop pin back to the ratchet wheel, and the type wheel is in unison with the dot key, and free to move forward when it is mised

Before a message is transmitted the engine should be started, and the type wheel allowed to rotate until stopped by the unison arm; then the first dot key should be depressed and held down until the printing lever is thrown up; then the type wheels will be released, and will correspond with your transmitter, and the message can be sent. In the act of sending a message the finger alsould not be raised from one key until the next is depressed, otherwise the type wheels might run to unison before the desired letter could be found, and thus put both type wheels out of unison with your transmitter. The keys should not be raised until the printing lever is heard to strike the type wheel.

It sometimes occurs that the type wheel of one instrument will catch at unison on the second revolution, and the other instrument on the third revolution; therefore, when your type wheel is stopped by the unison, you should allow it to be looked for two or three seconds, to easure the looking of the distant type wheel before depress-

ing the union dot key.

In receiving the message, if it is found that, after two or three words have been printed correctly, the type wheel throws out and commences to print a jumble of letters, you can break the transmitting operator by turning your switch and starting the engine for an instant. The trussmitting operator will notice the irregular breaks omitting operator will notice the irregular breaks mixing possible will notice the irregular breaks go aloned; but it is better for the transmitting go aloned; but it is better for the transmitting

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when he hears the receiver break. This will prevent the necessity of telling him where to go ahead and save time.

By referring to figure 7 it will be noticed that there are two screws, 192, having jam unts upon the armature of the printing lever, and are so adjusted that when the armature is attracted the points of the screws hit upon the heads of the magnet cores. The object of these limiting screws is to prevent the printing lever pressing too hard against the type wheel. In fact, the dead motion or shake in the centre screws, which hold the printing lever, is sufficient to allow the upward movement of the printing lever to print the letter and fall back a slight distance from the type wheel; so this prevents the type wheel from being retarded by the printing lever, when it is suddenly started by the mising of a finger key. Were there no scrows in the armature of the printing lever, it would lag against the type wheel, throwing it out of unison. The employment of the screws slightly affects the clearness of the letters; but this is more than compensated for by increased reliability of transmission and reception of the message. The shaft, 195, should have some side shake.

The escapement lever shaft, running ou the scrows, 139, should work freely, but have no side shake, otherwise it will surely throw out the type wheel at intervals.

The two prongs of the escapement lover strike the teeth of the ratchet wheel upon their extreme edge; any shake in the escapement lover shaft will allow the lover to fall away from the methet wheel, and hit upon the edges of the teeth.

The jam nut of 189 should be kept very tight.

Safety Click.

113 (fig. 3) is called the safety click, its object being to prevent the displacement of the type wheel shaft at the point where the two prongs of the escapement lever are not touching the ratchet

The point of this click should be oiled, as well as the ratchet wheel.

Inspectors should notice the tensions of the springs and adjustment of the different devices of the instrument when received from the shop, and endeaver to keep them as near to that point as possible when placed upon the line, otherwise an

improper tension of some small spring may prevent the instrument from working satisfactorily.

Diagrams.

Fig. 9 shows the connections for one pair of

The engine and printing local have three cups of battery each, the two zinc ends of which are connected to the return binding post of the instrument. The main battery can be divided, half being placed at each end of the line, or all may be placed at one end or in the middle.

Ax is a switch, which is sometimes included in the main circuit, to open it at night and provent the consumption of battery material.

Fig. 10 shows the connections for three instruments, with the battery at one end, and a switch for opening the main circuit at night.

Testing Instruments.

Before starting a line the battery should be set up and "short circuited" for one or two days, and the instrument thoroughly tested before it is placed upon the line. UNIVERSAL STOCK PRINTER.

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The amount of battery required to work the printing lover magnet is three oups; three for the ongine; five oups main for each instrument, and five cups for each mile of line wire; providing, of course, that there are no bad connections or defective ground wires. Any extra battery put on the main will give the instrument a greater margin for adjustment.

Spare Instruments.

A set of spare instruments, thoroughly tested, should be kept on hand to relieve defective instruments outside until they can be repaired.

Dust.

The instruments should be kept free from dust and paper fibre by the inspector. This can be best done by using a wide camel hair brush for the fibre and dust, and a small piece of chamois skin to clean the parts.

The inspector should visit ench instrument in the morning; start it up and print n few words, and note how the instrument has worked the previous day by referring to the slip; notice the strength and condition of the battery, and see that the most important screws are tight.

Inking.

In initing the instrument do not put too wush on at once; nuise the ink roller off the type wheel, hold it in position and napply the sike with a small cauch hair brask equally over the whole of the cloth of the startments have worked as covered words the sharp odge of the letters will have soon as endershale assument of filthe from the cloth of the order of the cloth of the order of the sharp odge of the letters will have soon as endershale assument of filthe from the cloth of the order of the letters. This can be removed by place prices on the letters. This can be removed by they are picco of stiff paper up to the side of the type wheel and brashing then out by uncovering the clamping second of the country of the control of the country of the c

the type wheel scaled in bentante or turpentine, using a brush, and wiping thry before replacing. In taking out any shaft, anch as the type whoel shaft, printing ror occupement lover shaft, be careful and descen only one serves, so that when it is replaced it will return to the same position it occupied before it was taken out.

UNIVERSAL STOOK PRINTER.

When an instrument is rejorted to be working beally the first thing is to ascertain that there is no trouble on the line, or with the battery, as it frequently occurs that line and battery troubles are attributed to the instrument, and the mistake not found out until the instrument has been demoralized by edjusting it in all manner of ways. The following are some of the faults generally

found when the instrument is reported out of order:
PAPER CAUGHT:—Probable Cause.—First. Reel
sleeve bound, or paper unwound and kinked.
Second. Paper put in wrong.

To Fire it.—First. Loosen the jum nut. Second. Instruct subscribers to put the paper in properly. Parent FALLING TO FESD.—Frobable Cause.—First. Blind in recl. Second. Teeth on upper feed click dull. Third. Spring too weak to hold click down on the paper. Fourth. Teeth of lower stage, click to feel click dull. Down stage, click to the control of the paper. Fourth. Teeth of lower stage, click to the control of the control o

To Fix It.—First Lossen the jam nut. Second.

Sharpen the teeth to a fine point with a small oil stone. Third. Pall some of the spring through once of the holes, to increase its tension. To make sure that you have remedied it, hold the lower

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stage elick away from the paper, and try to pull it (the paper) back and forward several times through the instrument. If the feed elick provents the paper from being pulled back the defect has been removed. Fourth. Do precisely the same with the stage click.

ESOAPEMENT AND PRINTING LEVER SPRINGS
OUT OF ADJUSTMENT.—Probable Cause.—First
Taper adjusting pias shaken loose by the jar of the
instrument. Second. Thread broke. Third. Spring

stretched so far as to lose its clasticity.

To Fiz R.—First. Readjust the taper pins, and push them in very tightly by the hand, and afterwards give them a sharp rap with the handle of a screw driver. Second and Third. New thread and

BAD PRINTING.—Probable Cruss.—First. Type wheel full of fibre. Second. Ink too thin. Third. Too much link on. Fourth. Ink roller uneven, and does not hik portions of the type. Fifth. Type wheel not set properly to strike the lotter quare. Sizid. Pad too flat. Second. Initiation goewn in the printing lever armature adjusted so as to prevent the printing lever from coming up far enough to give a good impression. Epiphid. Not enough battery power to effect the impres-

sion. Mend, Bad pad.

70. Fix B.—Pira. Clean the type whoch. Second.
Use thickened into. Third. Clean of a portion of
the int. Fourth. Clamp for an even roller.
Fiph. Set the type wheel so that it will print the
theoretical print of the clear that the clear full, and not print the edge of the identers and
each side of it; leave the server which secures the
type whoel to the sidal very tight, no person the
type whoel so the sidal very tight, not portent the
type whoel silpping. Stach. Now pad. Second.
Adjust the limiting servers as before described,
and tighten the jam mut, or the yell siddle on
the content of the sidal printing of the content of the
theory of the content of the content of the
theory of the content of the content of the
first printing leave works freely, and fix the battery.
Nath. New void.

It will be seen from the above that there are a great many ways in which bad printing occurs, and it will be found that the inspector needs considerable experience to obtain good printing.

Throwing Out of Type Wheel.—Probable Gauss.—First. The escapement lever and type whoel shafts have too much side shake in their centre or pivet scrows. Second. Not adjusted properly. Third. Main break adjusted to give

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too long or short closing of sirenit. Found, and the limiting of the shafe in their centre serves. Fifth Centre serves loose. Sixth. Too much tousino nich union arm spring. Served. Union arm does not go back far enough. Elgish, allowed as light color on the matter of escape-line (see than $\frac{1}{4}$ of an inch). Nindh. Allogests adjusted to close to surmature of escape-links. Each. In the phenoise not the safety factor of the safety of the composition of the safety color. The safety of the composition at each revolution. Elecad. Not enough but at each revolution. Elecad. Not enough that each revolution of the safety for the composite teen in withruiting contact spring adjusted to that the private safety of the composition of the safety of the composition of the safety of the safety of the safety of the composition of the safety of

To Fix R.—First. Take all the shake out of the exequences lever shaft that is possible, but between considerable shake in the type wheel shaft, Second. Adjist properly, which can only be learned by ex-periones. Third. Adjust the main break so that the pulsations will sound like short Morse dashes. Fourth. Loosen slightly and set the jam nut tightly, and oil. Fight. Tighten. Sext. Decrease the tension so that there will be only enough to pull the unison arm back, and put a little oil in the slot, 201, of the unison tripper. Seventh. Not enough tension on the unison spring, or mison arm bound in serow, or not lifted high enough out of worm; unison tripper bent. Eighth. Adjust type wheel magnets about two thicknesses of paper away from the armature when the circuit is closed. Ninth. Increase or decrease the tension, by taking up or letting out the spiral spring; the tension on the click should be a little more than the tension of the spring on the unison arm. Tenth. Two turns of sounder wire around the ink roller shuft nearest the unison pin, which will provent the ink roller from approaching near it. Eleventh. Experience will determine this. Twelfth. Too much shake in the escapement lever or type wheel shafts. Thirteenth. Clean the platina points of the main break with fine emery paper, and be sure the trouble is not on the line or a bad connection in the instrument or office.

Unison Arm not Catching.—Probable Cause.

—First. Stop pin too smooth.

To Fix R.—First. Roughen the end.

ENGINE FAILS TO START WHEN THE SWITCH

IS TURNED AND THE STAITER PUSHED IN.—Prob-

the finger.

justed away from the collar.
Engine Stops or Slows Down when a Key IS DEPRESSED. - Probable Cause. - First. Too much friction on the spring, 35 (see fig. 6), or not enough to throw the click, 39, out, and the end keeps knocking on the edge of the rateliet teeth.

To Fix It.-Increase or decrease the tension of the spring by means of the screw, 47. ENGINE MECHANISM WORKS HARD.—Probable

Cause.-First. Arms bent. Second. Dust. To Fix It.-Work it up and down rapidly with Parts.

All defective or broken parts should be sent

FINGER KEYS STICKING DOWN .- Probable

GOLD AND STOCK TELEGRAPH CD.'S

to the Superintendent at New York, and new

If inspectors will carefully read and follow these instructions, which are the result of experience, they will save themselves much trouble. Do not attempt to file, bend or tinker with the parts, as new parts can be supplied from New York.

Batteries.

The battery used with these instruments is that known as the Baltimore Battery. It is a modification of the gravity battery, on the same principle as the Hill and Calland. Each cell consists of—1st A glass jar. 2d. A copper strip, corrugated and formed into a circle, which lies at the bottom of the jar, and connected with a copper bottom of the par, and connected with a copper wire, insulated, which passes out and connects with the next cell. 3d. A size casting in the shape of n whoel without the rin, and three arms by of a water without the ran, and three arms by which it is suspended at the proper height. 4th. A glass tube, which passes through a hole in the centre of the zine, and has its lower end stopped by a cork, in which are cut large notehes. 5th. A connecting serew, which is attached to one of the zinc arms, and answers the purpose of holding up

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the zine, and also connects it with the copper of the next cell. 6th. Two pins to put in the holes of the other two zine arms, thereby assisting in holding the zine up to the proper level.

Quantity of Battery Required.

For the local batteries which work the "engine" and the "press magnets" use the large size or "local" cells. For the main circuit which works the escapement magnet use the small size or "main" cells. The only difference is in the

Put three cells local on the printing magnet, and three cells on the engine, on each instrument.

In calculating amount of main battery required, allow five cells for each instrument in the circuit, and five cells for each mile of line, provided ordinary telegraph wire is used. If the resistance of your line exceeds fifteen ohns per mile you may need more main battery than the above.

This rule holds good only for short lines; ou lines of four or five miles and over the number of eells may be reduced.

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Putting up the Battery.

Place the glasses in position and fill them with pure water to within three inches of the top. Throw into each cell a quarter of a pound of sulphate of zine, and stir it up woll, se as to dissolve it as much as possible. Place the copper in the bottom of the cell, allowing the insulated wire to hang out on one side.

Put the two pins into the heles in the two arms of the zine, and attach the binding serew to the other arm at the same height as the holes with the pins in. Suspend the zine in the cell, the two pins and the binding serow resting on the edge of

Place the cork in the bottom of the glass tube, Place the cork in the bottom of the glass tube, having first cut four large notehes in the sides of it (the cork)—they should be large enough to let your little finger hass through into the tube.

Now fill the tube half full of lumps of blue vitriol, and place it in the cell, letting it pass through the hole in the zine and rest on the bot-

Then connect the whole battery up on "short circuit" and let it remain so for two days, taking UNIVERSAL STOCK PRINTER

care to replenish the tube with lumps of blue vitriol every day. It will sometimes take more than two days to bring the battery up to the proper strength.

Keeping the Battery in Order.

The action of the battery is as follows:

The blue vitriol in the tube is dissolved, and the solution descends through the notelies in the cork and spreads out over the bottom of the cun. When the battery is kept closed the blue solution will generally rise about half an inch, or an inch at most, and as the lumps of blue vitriol in the tube dissolve, more should be added, and the tube should never be allowed to stand without any in it.

It is not advisable to fill this tube with lumps above the water line, as they sometimes cake together at the surface of the fluid, and the consequence is the tube may appear to be full, look; ing at it from the top, while in reality there is only a crust of blue vitriol there, and none at the bottom to keep up a supply in the jar.

To make sure of its condition, examine the tube

through the sides of the jar. If the liquid is too

OOLD AND STORE TELEGRAPH CO.'s dark to do this poke a stick down into the tube gently, and if it is not full you will break through

the crust, and can then put in more lumps. It is not necessary the blue vitriol should be in lumps, but it is better. If there is powdered material with the lumps it can all be put in together. When in working order, the liquid lying above the solution of blue vitriol in the jar will consist of sulphate of zinc dissolved in water. When this solution is too weak the battery will not be strong enough to work; on the other hand, when it becomes too strong it also weakens the battery; therefore, it is important to know its condition at any time, which can be done with the "standard bydrometer" furnished (in a case) with the battery.

The stronger the solution of sulphate of zine the bigher will the hydrometer rise in it. When the top of the stem just shows above the surface the solution is strong enough to work. When the shoulder of the bulb appears at the surface the solution is getting too strong, and should be diluted. To do this, draw off about two inches of it, and fill up carefully with water.

The most troublesome feature in the battery is the formation of efflorescent crystals of sulpliato of zinc on the edge of the glass above the liquid; they should be cleaned off as they accumulate, and saved to start new batteries with. Owing to a battery being too much on open

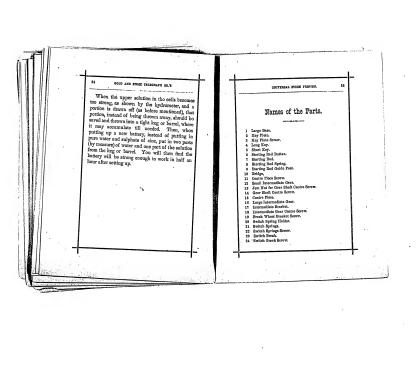
circuit the blue solution will sometimes rise till it reaches the zine. In this case the battery should be short-circuited over night, which will bring it down. About once in three months the zine should be carefully lifted out of the jar without disturbing the liquid, and the black scale and deposit

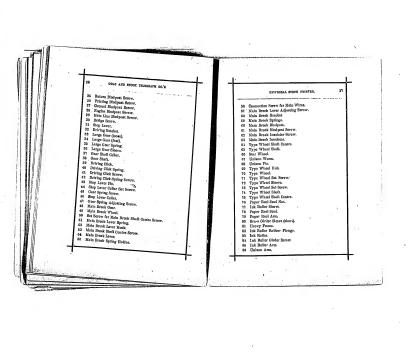
knocked or seraped off. Then return the zine carefully as it was.

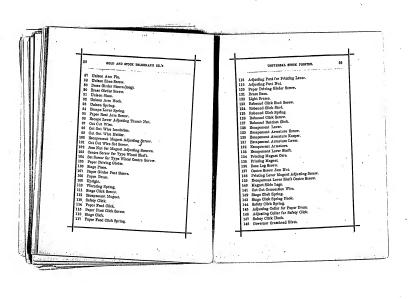
When the water in the jar evaporates it should be replenished by pure water. The copper at the bottom will become covered with a mass of metallic copper; this will do no harm till it becomes so large as to be in the way, when a new copper must be put in. The old copper with its deposit is valuable, and must be kept and seat to New York from time to time as it accumulates. About once a year the whole battery should be

taken down, cleaned and put up anew. When a good many colls of this battery are in use, new cells can be started at once in full

strength in the following way:

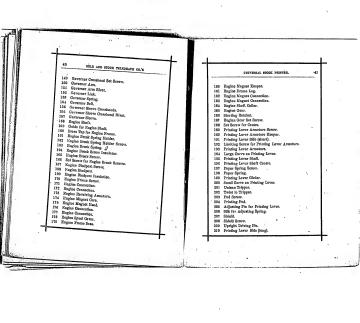


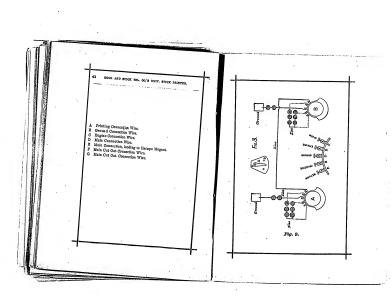


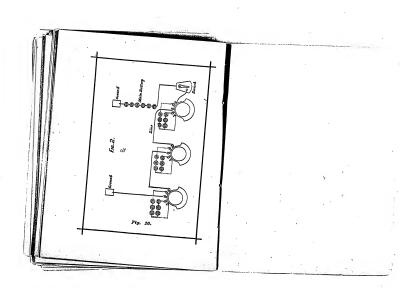


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Menlo Park Manufacturing Company

This folder contains printed material issued by the Menlo Park Manufacturing Company. This company was organized in 1879 under the direction of Charles H. Lewis, Francis W. Jacobs, and William McMshon. It was licensed to manufacture Edison's Polyform, a medicinal formula that the inventor tried unsuccessfully to patent. The company abandoned the manufacture of polyform about 1881 after the business proved unprofitable.

The following items have been filmed:

- Label from a bottle of Edison's Polyform (ca. 1880)
- Advertising circular (ca. 1880)
- Advertisement (Scribners, November 1880) Advertisement (ca. 1880) [photocopy] 3.







Prof. Edison, the world-renowned Scientist and Electrician, has been granted many patents for his inventions, but among them all, nonewill confer so much happiness upon mankind as

EDISON'S POLYFORM

It was devised originally to cure himself, obtaining publicity by accident, he received so many inquiries for it that it has been put in the hands of the drug trade for sale.

EDISON'S POLYFORM is a compound to cure-

NEURALGIA, RHEUMATISM

HEADACHE and all NEPOUS PAIR,
by external application. In no case has it been known to fall in giving relief when properly used according to directions.

We append the certificate of the distinguished inventor which speaks for itself:

MENLO PARK, N. J.

I certify that the preparation known as RDISON'S.
POLYFORM is made according to formula devised, and used by myself.
THOMAS. A. EOISON.
SOLD BY ALL DRUGGISTS.

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int that Orgentee. It is measure for the same has also of this some have induced in any cretical physicisms to of this send 20th placeses, for the Tolkes, and particles. Hencehouse and Chapping avoided and a good ER'S TAN SOAL.

VANITY FAIR Tobacco and Cigarettes. Aberglishen and Cigarettes. Pen Phen Media Viena, 1873; 1984, 1965; 1964, 1975; 1989, 1986.

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Scribners map - Nov 1880



Polyform

CURES

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And all Nervous Pains.
PREPARED BY THE
Menlo Park Manufacturing Co., New York.
PRICE, \$1.00-80LD BY ALL DRUGGISTS.
EDISON'S CURE

Thomas A. Edison's renture into the field of "electrical cures." An advertisement in "The Youth's Companion," November 10, 1881.

From "Oscar Wilde Discovers America 1882"

By Lloyd Lewis and Henry Justin Smith (Harcourt, Brace and Company)
p-260

Sims-Edison Electric Torpedo Company

This folder contains printed material issued by the Sims-Edison Electric Teopeo Company. This company was incorporated Pebruary 16, 1886 to construct torpedoes, torpedo beats, submarines, and other instruments relating to naval warfare. Edison served as the consulting electrician and as a trustee of the company.

The following items have been filmed:

- "Certificate of Incorporation and By-Laws" (1886)
 "Sketch of the Sims-Edison Electric Torpedo . . ." (1886)

THE SIMS-EDISON
CLEATRIC TORPEDO CO.

THE SIMS-EDISON

ELECTRIC TORPEDO COMPANY.

CERTIFICATE OF INCORPORATION

BY-LAWS.

NEW YORK:
PRESS OF E. D. SLATER, EGS to 155 FULTON STREET

THE SIMS-EDISON

ELECTRIC TORPEDO COMPANY.

OF WORDS A

JOHN ANDERSON, President, GARDINER C. SIMS, Vice-President, ELWIS MAY, Tressurer, FRANK W. ALLIN, Scort SIMS, General Manager THOMAS A. EDISON, Committing Electrician. Consulting Engineer.

TRUSTEES.

THOMAS A. EDISON,
GARDINER C. SIMS,
LEWIS MAY,
M. N. DEEN,
FRANK W. ALLIN,

GEO. II. STAYNER.

WN, M. DEEN, CHARLES BATCHELOR, GARDNER C. SIMS.

PINANCE COMMITTEE.

LEWIS MAY, GEO, H. STAYNER, FRANK W. ALLIN, W. SCOTT SIMS.

CERTIFICATE OF INCORPORATION.

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK.

We, THOMAS A. EDISON, CHARLES BATCHELOR, GARDINER C. SIMS, W. SOOTT SIMS, LEWIS MAY, JOHN ANDERSON, WILLIAM M. DEEN, FRANK W. ALLIN AND GEORGE H. STAYNER, do hereby certify as follows:

Ptrst: That we desire to form a company pursuant to the provisions of an act entitled, "an Act to authorize the formation of corporations for manufacturing, mining, mechanical or chemical purposes," passed February 17, 1848, and of the several acts extending and amending said Act.

Second: That the corporate name of the said Company is to be "The Sims-Edison Electric Torpedo Company."

OPRTIFICATE OF INCORPORATION.

Title?. That the objects for which the company is to be formed are as follows, to wit: The manufacture, sale and use of torpedoes, torpedo boats, submarine vessels and war ships, war materials, electric muchinery and instruments, dynamo machines, electric nicks, writes, motors, electric lights and all appliances for the same together with steam engines, oblien and supplies of every kind; also the purchase of letters patent of the Inited States and elsewhere for inventions and discoveries relating to torpedoes, torpedo boats and submarine vessels and representation of the inited States and elsewhere for inventions and about the production thereto depoint the product of the production thereto depoints the product of the production thereto depoints of the production thereto depoints of the production of the production thereto depoints of the production of the production thereto a production the production of the product

Fourth: That the amount of the capital stock of the said Company is to be one million dollars. Fifth: That the number of shares of which

Fifth: That the number of shares of which said stock is to consist is to be ten thousand of one hundred dollars each.

Stath: That the term of the existence of the said Company is to be fifty years.

Seventh: That the number of trustees who

CERTIFICATE OF INCORPORATION.

shall manage the concerns of the said company

Bighth: That the names of such trustees for the first year are Thomas A. Edison, Charles Batchelor, Gardiner C. Sims, W. Scott Sims, Lewis May, John Anderson, William M. Deen, Frank W. Allin, George H. Stayner.

Ninii: That the name of the town and county in which the business of said Company is to be carried on are the City and County of New York which is to be the principal place of business of this Company.

Witness our respective hands and seals this 16th day of February, A. D. 1886.

THOMAS A. EDISON, (s. s.)
CHAS. BATCHELOR, (s. s.)
GARDINER C. SIMS, (s. s.)
W. SCOTT SIMS, (s. s.)
LEWIS MAY,
JOHN ANDERSON, (s. s.)
JOHN ANDERSON, (s. s.)
FRANK W. ALLIN, (s. s.)
GEO. H. STAYNER, (s. s.)

In presence of

FREDERICK R. ORR.

On this 16th day of February, A. D. 1880, before me personally came Thomas A. Eddison, Chamles Barchinkov, Gambies O. Suis, Lewis Max, John Ardenson, William M. Ders, Flank W. Allin, School H. Paty Park in one respectively known and known to me to be the several persons who executed the foregoing cortificate and respectively acknowledged to me that they executed the same.

FREDERICK R. ORR,

Notary Public, Kings County,

Certificate filed in N. Y. County.

STATE OF NEW YORK,

CITY AND COUNTY OF NEW YORK.

I, James A. Flack, Clerk of the City and County of New York, and also Clerk of the Supreme Count for the said City and County, the same being a Court of Record, do hereby certify, that, Frederick R. Orr, has filed in the Clerks Office of the Country of New York, a certified copy of his appointment as Notary Public for the County of Kings with his autograph signature and was at the time of taking the proof or acknowledgment of the annexed Instrument duly authorized to take the same, and further that I am well accomainted with the handwriting of such

authorized to take the same, and rather of an well acquainted with the handwriting of such Notary, and verily believe that the signature to the said certificate of proof or acknowledgment is genuine. I further certify, that said instrument is executed and acknowledged according to the law of the State of New York.

In Testimony Whereof, I have hereunto set my hand and affixed the Seal of the said Court and County the 17th day of February, 1886.

JAMES A. FLACK, Clerk.

STATE OF NEW YORK,

STATE OF NEW YORK,
OITY AND COUNTY OF NEW YORK.

I, James A. Flack, Clerk of the said City and County, and Clerk of the Supreme Court of said State for said County, do certify, that I have compared the preceding with the original Certificate of Incorporation of THE SIMS-EDISON ELEC-

TRIC TORPEDO COMPANY, on file in my Office, and that the same is a correct transcript therefrom, and of the whole of such original. Endorsed, Filed and Recorded 17th February, 1886, 10h 50m. In Witness Whereof, I have hereunto sub-

scribed my name and affixed my Official Seal, this 18th day of February, 1886.

JAMES A. FLACK, Olerk. { <u>L. 8.</u>

STATE OF NEW YORK, OFFICE OF THE SECRETARY OF STATE

I have compared the preceding with the original Certificate of Incorporation of The Sims-EDISON ELECTRIC TORPEDO COMPANY, with acknowledgement thereto annexed, Filed and Recorded in this Office on the 17th day of February, 1886, and do hereby certify the same to be a cor-rect transcript therefrom and of the whole of the said original.

Witness my hand and the Seal of Office of the Secretary of State, at the City of Albany, this 17th day of February, 1888.
FREDERICK COOK,

Secretary of State.

RY-LAWS

THE SIMS-EDISON ELECTRIC TORPEDO COMPANY.

ARTICLE I.

ANNUAL AND SPECIAL MEETINGS OF STOCKHOLDERS.

Sec. 1. The Annual Meeting of the Stock-holders shall be held on the second Tuesday of February in each year. Notice of such meeting shall be published in some Newspaper in the City of New York at least ten days pirer director. Special Meetings of the Stockholders may be earlied as often as the Beand of Prastees may deem compellent. Notice of any special publishing the model of the Stockholders and publishing the publishing the publishing the special publishing the publishing the special publishing the special publishing the publishing the publishing the publishing the special publishing the publishing the publishing the special publishing the publishing the

residence at least ten days hofere the time of such meeting. Any special meeting may be adjourned to a tuture day; but no new matter, not specified in the original notice, shall be introduced or considered at any adjourned meeting, except by the manihoms consent of the stockholden present or represented. No vote, resolution, or desired the stockholders and adjournment, unless a majority in intense of the stockholders present and represented outer in such vote, resolution, or desired.

INSPECTORS OF ELECTION.

Sec. 2. The stockholders shall, at each annual election, choose by ballot two persons to act as Inspectors. Any vacancy that may occur by the death of an Inspector, or by his refusal to serve, or his neglect to attend on the day of election, shall be supplied by the Board of Trustees.

VOTES AND PROXIES.

Sec. 3. At all elections and business meetings of the stockholders, each share shall be entitled to one vote, and may be voted upon by the holder in person or by proxy; but all proxies shall be filed with the Socretary of the Company at or previous to the time of voting.

ARTICLE II.

ELECTION OF TRUSTEES.

Sec. 1. A Board of Trustees shall be elected at each annual meeting of the stockholders of this Company to serve for one year next ensuing.

If for any reason at any annual meeting of stockholders as provided by Art. I, Sec. I, of these By-Lawas Bard of Trustees should not be elected the Board in existence at the date of such annual meeting shall hold over until their successors are chosen or elected as herein below provided for.

A special meeting for the election of Trustees in pinco these boding over may be called as the control of the c

Sec. 2. All vacaucies in the Board of Trustees shall be filled by a majority of the Trustees remaining in office.

MEETINGS OF TRUSTEES.

Sec. 3. Stated meetings of the Board of Trus-

tees shall be held on the second Tuesday of each month. All regular or special meetings may be held at any time upon the call of the President or any four Trustees, due notice of which shall be given by the Secretary.

QUORUM.

At all meetings of the Board of Trustees five shall constitute a quorum for the transaction of business.

SPECIAL MEETINGS.

Sec. 3. No business shall be taken up or acted on at a special meeting, except that referred to in the notice of such special meeting, unless with the consent of the majority of the whole Board.

ARTICLE III. OFFICERS.

Sec. 1. The officers of the Company shall be a President, a Vice-President, a Treasurer, a Secretary, and a General Manager.

PRESIDENT, DUTIES OF.

Sec. 2. The President shall, if present, preside

at all meetings of the Stockholders and Trustees: he shall be ex officio member of all standing committees; he shall also attend the meetings of any special committee when requested by the Chairman.

Sec. 3. It shall be his duty to sign all deeds, contracts, or other instruments in writing entered into by or on behalf of the Company when the Executivo Committee so direct or approve or authorizo the same to be done; to sign all certificates of stock and affix thereto the scal of the Company to all instruments in writing when the Board shall so authorize and order; and, generally, he shall perform all the acts incidental to the office of President, and all and any acts which the majority of the Board may direct by vote at any meeting.

Sec. 4. The President shall have exclusive charge of the corporate seal of the Company.

VICE-PRESIDENT, DUTIES OF.

" Sec. 5. In the absence of the President his duties shall devolve upon the Vice-President; and if both President and Vice-President should be absent, the Board shall elect a President pro

tem, who shall have and exercise the powers of President until the President or Vice-President resumes his duty.

TREASURER, DUTIES OF.

Sec. 6. The Treasurer shall have the custody of all the funds of the Company, and shall keep them in such bank or other depository as the Trustees shall designate, in the name of the Company. He shall sign receipts and acknowledgments for all money and other property of the Company which may come into his hands, and disburse and appropriate the same only under the direction and with the sanction of the President, in pursuance of the By-Laws. He shall render a full and particular statement of his cash accounts, accompanied with vouchers, at every annual meeting of the Company, showing the condition of its financial affairs, and a similar account at every regular or special meeting of the Stockholders, when required by a vote thereof so to do. He shall also render a statement of the accounts of the Company to the Board of Trustees at their regular meetings, and at their special meetings, when so required by vote of the Board,

Sec. 7. No money shall be withdrawn from the bank or other depository of the Company, except on the check of the Treasurer, countersigned by the President; and in the absence of the President, the same shall be countersigued by the Vice-President or President pro tem.

SECRETARY, DUTIES OF.

Sec. 8. The Secretary shall notify the Stock-holes and Board of Trustees of all the special meetings, and shall record the proceedings of all their meetings in a book to be kept for that purpose, and shall conduct the correspondens of the Company under the direction of the President or Trustees, and shall perform such other duties appearining to his office as may be assigned to him by the Board of Trustees, or by the President.

Sec. 9. In the absence or disability of the Treadurer or Secretary, the Board of Trustees shall appoint a Treasurer or Secretary pro tem who shall have and exercise the powers of Treasurer or Secretary, until the Treasurer or Secretary, resumes his duty.

.

ARTICLE IV.

Sec. 1. There shall be an Executive Committee, composed of three members of the Board of Trustees, which shall (with the aid of the Secretary, when requested) keep a record of its proceedings, to be submitted to the Board at each regular meeting of the Board, or as often as may be required by the Board. A majority of the Committee shall constitute a quorum. It shall make its own rules and regulations, not inconsistent with the By-Laws of the Company. Such Committee shall be chosen, and vacancies therein filled by the Board of Trustees. It may be called together by the Chairman, or by any two members thereof, for special business.

Sec. 2. The Executive Committee shall advise with and aid the officers of the Company in all matters relating to or touching its interests.

Sec. 3. It shall employ all necessary employees, and shall fix the amount of salary to be paid to any officers or employees of the Company.

Sec. 4. It shall have charge and direction of all the details of, and have the general management of the business of the Company, and shall .

report at the regular meetings of the Board of Trustees.

Sec. 5. The appointments made by, and all other acts of the Executive Committee, shall be subject to the approval and ratification of the Board of Trustees.

ARTICLE V.

Sec. 1. There shall be a Finance Committee, composed of four members of the Board of Trustees which shall (with the aid of the Secretary. when requested) keep a record of its proceedings, to be submitted to the Board at each regular meeting of the Board, or as often as may be required by the Board : A majority of the Committee shall constitute a quorum: It shall make its own rules and regulations, not inconsistant with the By-Laws of the Company. Such committee shall be chosen, and vacancies therein filled by the Board of Trustees. It may be called together by the Chairman, or by any two members thereof for special business.

Sec. 2. The Finance Committee shall superintend all the financial operations of the Company and shall meet at least once in each month to

examine the books and vouchers of the Company, subject to the approval of the Board of Trustees and shall make full reports monthly of the financial condition of the Company.

Sec. 3. All acts of the Finance Committee shall be subject to the approval and ratification of the Board of Trustees.

AUDITING COMMISSION

Sec. 4. At the close of each fiscal year the accounts and assets of the Company shall be examined by the Finance Committee and the report of such Committee shall be placed on the minutes.

ARTICLE VI.

ORDER OF BUSINESS.

Sec. 1. The following order of business shall be observed at the stated meetings of the Board :

- 1. Roll-call.
- 2. Reading Minutes of Previous Meeting.
- 3. Reports of Standing Committees.
- 4. Reports of Special Committees.

BY-LAWS.

21

 Reading Communications addressed to the Board or its officers.

- 6. Deferred and Unfinished business.
- 7. Treasurer's Report.
- 8. New Business.
- 9. Adjournment.

SPECIAL COMMITTEES.

Sec. 2. All Special Committees shall be appointed by the President, unless otherwise specially ordered by the Board.

ARTICLE VII.

ISSUE AND TRANSFER OF STOCK.

Sec. 1. The Certificates of Stock, shall be numbered and registered as they are assued in some financial institution located at Sec. 2. New York to be designated by the Board of New York to be designated by the Board of Trustees; they shall exhibit the holders name, and the number of shares, and shall be signed by the President or Vice-President, and countersigned by the Secretary, and shall bear the corporate seal. Transfers of stock shall only be made on they books of the Company, in the pre-

sense of the Scorelary or other authorized agent of the Company, sider by the holder in person or by attorney; and the possession of a Certificate of Stock shall not be regarded as vesting any ownership of the same in any other than the person in whose name it is issued, (as between the Company and such other holder) until the transfer is duly made on the books of the Company as adoresaid.

OERTIFICATES PRESENTED FOR TRANSFER TO BE OANOELLED.

Sec. 2. When a Certificate is first presented for transfer to the President or authorized agent of the Company, the same shall be cancelled.

DISPOSITION OF CANCELLED CERTIFICATES.

Sec. 3. The Cancelled Certificate shall be pasted on the margin of the book from which it was taken when originally issued.

LOST OR DESTROYED CERTIFICATES.

Sec. 4. If any porson claim a Certificate of Share of the Capital Stock of this Company, to be

issued in lieu of one lost or destroyed, he shall make an stiffactive the fact, and state the circumstances of the loss or destruction; and he shall advertise in one or more of the public newspapers of the City of New York, to be designated by the President, for the space of six weeks, an account of the loss or destruction, describing the Certificate, and celling upon all process to show cause the state of the loss of the

ARTICLE VIII.

TRANSFERS OF STOCK.

• Sec. 1 Transfer of Stock shall be made on the books of the Company by the holder in person or by attorney. No stock can be transferred unless by surrender of the Certificate representing the same.

TRANSFER BOOK, WHEN TO BE OLOSED.—DIVIDEND TO WHOM TO BE PAID.

Sec. 2. The Transfer Book shall be closed ten days previous to the Annual Meeting of the Stock-

"

holders, and to the meeting for the election of Trustees, and to the payment of any dividend. And no dividend shall be paid except to the Stockholders registered as such at the time of the closing of the books

SKAL OF COMPANY.

Sec. 3. The Company shall have a common seal, with such inscription as shall be approved by the Board of Trustees.

DIVIDENDS.

Sec. 4. The Trustees shall declare dividends Sec. 4. The Trustees shall declare dividends of the profits of the Company, whenever they deem it expedient, of which due notice may be given in such manner as the Board shall direct.

DIVIDENDS MAY BE WITHHELD.

Sec. 5. It shall be competent for the Board of Trustees to withold any dividend declared due to any stockholder indebted to the Company.

ARTICLE IX.

These By-Laws may be altered or amended at any regular meeting of the Board of Trustees, notice thereof having been given at a previous meeting, in writing, of the alterations preposed.

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SKETCH

SIMS-EDISON ELECTRIC TORPEDO,

HISTORICAL, DESCRIPTIVE, AND ILLUSTRATIVE

ITS EFFICIENCY FOR HARBOR AND COAST DEFENSE,

ITS APPLICABILITY TO NAVAL WARFARE:

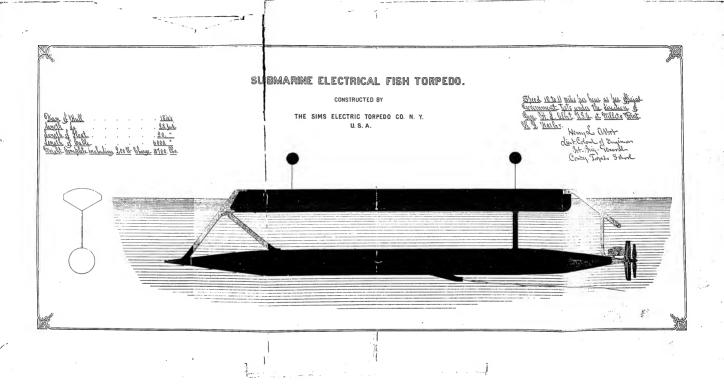
OFFICIAL CHARTS AND DESCRIPTIONS

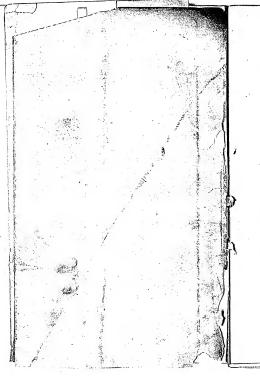
TESTS, TRIALS AND RUNS.

MADE BY THE

BOARD OF ENGINEERS OF THE U.S. ARMY.

THE SIMS-EDISON ELECTRIC TORPEDO COMPANY,





THE

Sims-Edison Electric Forpedo Company,

NEW YORK.

OFFICERS.

JOHN ANDERSON, President.

GARDINER C. SIMS, Vice-President.

LEWIS MAY, Treasurer.

FRANK W. ALLIN, Secretary. W. SCOTT SIMS, General Manager.

THOMAS A. EDISON, Consulting Electrician.

GARDINER C. SIMS, Consulting Engineer.

COUNSEL.

FULLERTON & RUSHMORE, New York.

CHAS. H. WOODRUFF, New York.

DAVID S. BAKER, Jr., Providence, R. I.

RUSTEES

THIOMAS A. EDISON.

GARLES BATCHELOR,
GARDINER C. SIMS,
W. SCOTT SIMS,
W. SCOTT SIMS,
W. SCOTT SIMS,
W. SCOTT SIMS,
DIHN ANDERSON,
Pres. Com. Tel. Co., 2 and 4 Stone Street.
W. M. DEEN,
FRANK W. ALLIN,
GEORGE H. STAYNER,
Banker, 25 Nassa Street.

EXECUTIVE COMMITTEE.
WILLIAM M. DEEN, CHARLES BATCHELOR,
GARDINER C. SIMS.

FINANCE COMMITTEE.
LEWIS MAY, FRANK W. ALLIN,
W. SCOTT SIMS, GEORGE H. STAYNER.

REGISTRAR OF STOCK, AMERICAN LOAN AND TRUST CO. OF NEW YORK.

THE SIMS-EDISON ELECTRIC TORPEDO.

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THE SIMS-EDISON ELECTRIC TORPEDO.

1. THE SITUATION AND ITS PROBLEM.

The Introvements that have been made in recent times, in ordance and in avail architecture, have completely revolutionized the methods and systems of coast and harbor defense. Rified cannon of long range, and armored ships of war rapidly moved by stems, have rendered coast and harbor defenses, that were once considered indregueable, as worthines for defense and as importent for offense, as if they were children's boys. And the problem that is now being anxiously pondered in all countries that have a more or less extensive seaboard, and important centres of commerce and population, is the crucial one, how to mottest these from the assaults of cossible or actual hostile avides.

It must be plain to all practical men that a nation whose defenses are powerless against the gaus and navies of other nations is in no condition to treat on terms of equality, much less of advantage, with such nations, and is at their merey—so first as its seacousts and the large cities which line it are concerned—in time of war. The great cities on its seaboard, which are the entrepois of supply and distribution for its people, are constantly menaced with the possibility of destruction, and the possibility of destruction, and the possibility of extractions of the proper themselves with the certainty of being laid under contributions register as advantageously as they might in the order of the properties as alwantageously as they might in time of peace with a nation and people well provided with offensive machinery, nor accessfully ence with them in time of world with offensive machinery, nor accessfully ence with them in time of the contribution.

While this state of the ease is so obvious as to need neither argument nor illustration as respects those nations whose people are averse, and whose institutions are unfriendly to the maintenance of large naval forces, and who therefore keep this arm of the national defense at the minimum, it is scarcely less obvious as relates to nations which maintain the largest, most powerful, and most perfectly equipped navies. For, however numerous and powerful the fleets. may be of any country having an extended scaboard and exposed cities and . harbors, one or more of innumerable causes arising from accident, from carelessness, from treachery, from incompetency, from storms, or from the menacing presence of an enemy in some other vulnerable quarter, may combine to leave a vital point exposed, which, if insufficiently protected may be destroyed and the adjacent country devastated or laid under contribution. This contingency is especally full of danger if the enemy is skillful, daring and active, and one who would not hesitate to sacrifice himself if he could thereby inflict a blow upon his adversary, involving loss of far greater magnitude than his country would suffer from his own destruction.

The property exposed to destruction in the twelve seaports—Portland, Portsmouth, Boston, Newport, New York, Philadelphia, Baltimore, Charleston, Savannah, New Orleans, Calveston and San Francisco—cannot be less in value than five thousand millions of dollars. To this must be added a vast amount of property dependent for its use on these scaports. Nor does this statement afford a true measure of the damage which might be caused to the property and business of the country by a failure to protect these scaports from hostile naval attacks. They are the centres, not only of foreign commerce, but of most of the internal trade and exchanges of domestic productions. To this state of things the machinery of transportation of the whole country has become adapted. The interruption of the currents of traffic by the occupation of one or more of our principal scaports by a foreign enemy, or the destruction of them by bombardment, or the holding over them the menace of destruction for the purpose of exacting contribution or ransom, would inflict upon the property and business of the country an injury which can neither be foreseen nor measured. The elaborate and costly fortifications, which were constructed with the greatest engineering skill, are now practically useless. They are not capable of resisting the attacks of modern artillery.

A still greater defect exists in our coast defenses. The range of the best modern artillery has become so extended that our present fortifications, designed to protect the harbor of New York, where two-thirds of the import trade and more than one-half of the export trade of the whole United States is carried Brooklyn to be of any value as a protection. To provide effectual defenses would be the work of years. It would take much time to construct permanent fortifications. A small provision of the best modern guns would take several years. Neither of these works can be extemporized in presence of emergent A million of soldiers, with the best equipments, on the heights surrounding the harbor of New York, in our present state of preparation, or rather in our total want of preparation, would be powerless to resist a small squadron of war steamers. This state of things is discreditable to our foresight and to our prudence.

The best guarantee against aggression, the best assurance that our diplomacy will be successful and pacific, and that our rights and honor will be respected by other nations, is in their knowledge that we are in a situation to vindicate our reputation and interests. While we may afford to be deficient in the means of offense, we cannot afford to be defenseless. The notoricty of the fact that we have neglected the ordinary precautions of defense invites want of consideration in our diplomacy, injustice, arrogance and insult at the hands of

2. COAST AND HARBOR DEFENSE

The problem of Coast and Harbor Defense, which, as has been seen, was forced upon the attention of the maritime and commercial nations of the world by the revolution that had taken place in ordnance and naval construction, has been studied with the gravest solicitude, for the last quarter of a century, by

the leading military men of Europe and America; but nowhere-and for obvious reasons—has it been pondered with as profound solicitude, and even anxiety, as it has been by the military and naval officers, and the scientists and inventors, of the United States of America.

Among the earliest conclusions, reached with substantial unanimity by all who have been engaged in the solution of this grave problem, are these: That all hitherto existing coast and harbor fortifications and defenses are utterly worthless as a means of resistance to the offensive appliances of modern warfare. And that the powerful war-vessels propelled by steam, rendered almost invulnerable to shot and shell by steel armor, and armed with longrange rifled cannon of enormous calibre, which are now built or are in process of construction, can pass unharmed any fort which has been, or, in the present state of military and engineering skill, can be constructed.

With equal unanimity they have also reached the conclusion that the torpedo is destined to enter largely into all future naval wars, and become, to a great extent, one of the most potent weapons, both offensive and defensive, in all wars in which fleets engage at sea, or coasts and harbors are defended. And further, that by the use of its combined forms in association with other permanent or movable defenses, an exposed coast-line or a harbor can be successfully defended against the most powerful guns and ships that modern skill and science have been able to perfect.

Before arriving at these conclusions an exhaustive study had been made of all the known forms of torpedo, having reference especially to the intrinsic and comparative value of each, to its efficiency either singly or in combination with other forms, and to its potency for offensive warfare at sca, or as a means both offensive and defensive for the protection of harbors and fortifications.

As a preliminary step, this study involved a careful consideration of the questions, What is required or expected of the torpedo system, with special reference to Coast and Harbor Defense? What are the elements of strength or weakness of the particular forms of torpedo that have been devised and per-

3. WHAT IS REQUIRED-ELEMENTS OF STRENGTH. The results of this inquiry may be briefly stated, as follows:

To be thoroughly effective the torpedo system must be equally reliable and serviceable for offense and defense. It must not only render the approaches to coast and harbors, and movements in the harbors themselves, slow, difficult, and dangerous, through the instrumentality of fixed mines, or torpedoes, which explode on contact, or by concussion, or otherwise. But as these are stationary, non-intelligent, and more or less easily removed or avoided by the ingenious devices that have been invented, and with which war vessels are provided, and therefore a temporary and imperfect defense only, they should be supplemented for their own preservation and also for the destruction of an enemy who may undertake to remove or avoid them, by a torpedo which combines the qualities

4. ELEMENTS OF WEAKNESS-INSTANCES,

The faced-union topeded, as its name implies, is a mine or magazine for powder or other explosive, which is fixed or anchored in the channel of a river, or in a harbor, the object being to explode it by the war vessel striking it or its attachments, or by means of an electric current from the shore when the evestle passes over it. The fact that list form of topedo and its application to harbor defense, have stimulated inventors and military and naval officers to harbor defense, have stimulated inventors and military and naval officers to expend great labor and study in more or less successful-efforts to discover some practical appliances for protecting and defending or for removing, overcoming, or destroying it, proves its genuine worth.

The weak or defective points of torpedoes of this kind are as follows: (I.) They are liable to be moved out of position, and their electric cables and other attachments disarranged by the force of currents or heavy seas, this being especially the case if they are suspended. (2.) Their electric cables and other attachments may become useless and inoperative through corrosion and decay, from prolonged immersion in salt water. (3.) The explosion of one will explode others if in close proximity, and if not so placed they are of less value as an effective bar to the passage of a hostile vessel up or down the channel or harbor. (4.) To be hurt by a fixed mine torpedo, a vessel must come to it, which fact greatly lessens the sphere of its uscfulness. (5.) A hostile vessel may clear a path for itself by sending a steam launch ahead to drop overboard other mines, which may be exploded after the launch has retired to a place of safety, and the concussion thus caused will explode all other fixed mines within a radius of from 50 to 100 feet (according to the power of the charge exploded). and open an unprotected roadway of from 100 to 200 feet in width, through which the largest ironclad can steam in perfect safety. Of course a channel thus cleared becomes an open and safe roadway for the hostile fleet that may follow in the track of the pioneer vessel, since other mines cannot be put in position to replace those destroyed soon enough to be of use.

Surface Torpedoes, that is to say, those which travel on the surface of the water, are of very little use, no matter how completely they may be under control, since by the interposition of rafts, cables, spars, etc., an enemy can prevent them from reaching their vessel. They can also be easily destroyed;

one shot from a Gatling or a Hotchkies gun, striking such a torpedof being sufficient to disarrange its machinery or to sink it. Moreover, even if it exploided close to an armored ship, the explosion being on the surface, at the point where its armor affords protection, any damage the surface torpedo would inflict would necessarily be comparatively slight.

The Soff-Propolity Travola, or the torpodo which contains within itself is propelling power, whether it be gas or compressed aft, is uncertain itself is movements, and its motive power being limited in quantity is gradually bein invertably evaluated, and the torpodo becomes inoperative, inert, and ecases to move. This is self-evident, since, as the power is applied, the stock of gas or morpersed air on board constantly grows less, and the torpodo generally slows down as it approaches an enemy, thereby presenting a good mark for his gas and being easily put ther at a conduct. Moreover, practical tests and this of such torpodoes have shown that they are often even more dangerous to friend than for, gas, in particula, being very intractable and difficult to handle, and not infrequently causing the torpodo to return, like a boomerang, to the vessel that sent it to out.

The Projected Toppedo, or one that is also from a gun or projected in early other may, passes intentify out of the control of its operator, is very uncertain in its movements, and if what under water as more likely to glance aside or to return to its point of departure that to strike the hostile wested at which was aimed, certain conditions of currents and tides imparting to it a boomerang direction, as in the case of the Self-Prophiling Topped in Topped Toppe

These several forms of torpedo are severally represented, in the order above named, by the kinds known as the Spar-Torpedo boat, the Lay Torpedo, and the Whitehead Torpedo-the first being a surface torpedo operated by a crew on board; the second a self-propelling surface torpedo impelled by gas stored on board; and the third a combination of the projectile and the self-propelling torpedo, moved by compressed air stored within itself. Besides the defects already detailed, these others may be stated: The efficiency of the Spar-Torpedo Boat depends upon the concerted action and efforts of a crew who are placed in an eminently hazardous position, and most emphatically constitute a "forlorn hope." The Lay Torpedo, being moved by power stored within itself, cannot be recalled after its stored power is expended; its speed and power steadily decrease from the time of its departure till the critical moment when both are most essential; and it must be stored on the deck or other exposed parts of a vessel, and is, therefore, a constant and menacing danger to a crew and ship in time of action. Finally, the effective range of the Whitehead Torpedo is only about 1,500 feet, and for this reason alone, even if there were no other, is practically useless.

ni L 5 THE SIMS-EDISON ELECTRIC (FISH) TORPEDO.

In the Sims-Edison Electric Torpedo, all the requisite elements of strength, convenience, and efficiency are united that have been above shown to be essential,

and all the defects and weaknesses are remedied so completely that, in its own sphere and within the scope that is claimed for it, it meets every requirement, while if associated with a reliable and effective flated units torpedo as an auxillary, it forms a perfect system of harbor and coast defense, impregnable by any means that military and naval science have been able to device.

The purpose of this pampilet is to lowice attention to this powerful offensive and defensive veopon of submarine warfare, and expectally to the condition evidence that is appended hereto, consisting of the official reports of the Board of Engineers and others of the United States Arm, establishing the facts that it enthraces the greatest, most important and most valuable discoveries and improvements yet devised in topedoes, and that it formats the most powerful and efficient instrument in existence for offensive warfare at sea, and for both offense and defense in the protection of constant and harders.

6 DESCRIPTION OF THE SIMS-EDISON TORPEDO.

The Sime-Edison Electric Torpodo from its shape and its facility of movement under water in very desired direction, popularly known as the Filb-4 son, as a submarine boat with a cylindrical half of copper and conical ends, either 28 feet long by 18 indees in diameter for one emil service, or 28 feet long by 10 indees in diameter, for two-mile service, made in four parts or sections united by means of fold-joints, and supplied with a serve propeller and rudder.

The hull is supported at a submerged depth by an intestructible float, which is attached to the hull by an epiptic steel standshon. Raced from a which is attached to the hull by an epiptic steel standshon. Raced from the art float and sho the hull are two reds for showing signal-flags, balls or lights, which red are hinged at the base with a spring-hinge so as to assume an oblique or horizontal position when meeting and moving under an obstruction, and to recover their profits position automatically when the obstruction is passed.

Both hall and float are protected from cables, ropes or other obstructions by a sharp steel blade, which runs from the bow of the hall to the top of the float and from the stern of the float to the stern of the hall, and is set at such an angle as to make the torpedo dive under or cut through any obstade. This device makes it possible to use the Sims-Edison Torpedo-among friendly boats or floating logs, ropes, cables or ice, with no risk of explosion, save when desired. This is nossible only with this torous the control of the possible to the control o

The Sims-Edison Torpedo is very simple and compact in its construction. It weight, all told, from 3,000 to 4,000 pounds, according to the distance to be overcome, but no single part or section weighs more than 800 pounds. It can be taken apart and put together again in less than fifteen minute; and it is not entire construction greatly facilitates its handling; transportation, and storage on a vessel of war or elsewhere. Copper and brass are employed in its construction, to avoid the rust and corrosion that would soon render a torpedo made of iron or steel useless, even if the iron is galvanized—steel being even more peritable from this cause than iron.

The power by which this torpedo is propelled, guided and exploded is electricity, generated by a dynamo-electric machine on shore or on shipboard, and therefore is practically inexhaustibla. This torpedo is the only one that is driven by a power not within itself.

The bow section of this torpedo contains the explosive charge, which varies from 250 to 400 pounds of dynamite, according to the size of the torpedo.

The electric current produced by the dynamo machine is conveyed to the topedo by a table stored in one of its sections, which is paid out as the topedo proceeds on its errand. The electric current is constant in supply, unlimited in amount, and at all times under the complete control of the operator by means of a key-board. The operator from his station on shore or on ship-board, can, at will, start, stop, or steer the torpedo to port or starboard explode the charge, which can also be arranged to explode by contact, if desired; and he receives notice when the hall or blade meet with any obstruction, together with the magnitude of the same, thus making sure of the proper moment for exclosed.

For Land Fortifications, it is proposed to have the Simp-Edison Torpadoanthored by means of electric cables, at different part of ports, or in hosproof canab with lock-gates, where also will be placed the stame-again, boiler, dynamo machine, and the operators for working them. The operators will receive orders by telephone or otherwise from sentines, pilots, or wastelmen stationed for that purpose. In such cases the operators and the machinery for generaing and transmitting the power, will at all time be in a place of safety, and the torprode and its apparetamence under complete contrib

For Naval Offensive Purposes, it is proposed to have one or more of the Sims-Edison Torpedoes travel, with its own power, about 100 feet ahead of or off from the side of a steam war-vessel, attached to the vessel by electric snapcables, the pilot of the vessel having control of the movements of the torpedo. By this arrangement the Sims-Edison Torpedo may travel any required distance at sea, and when wanted for action, it may be released and sent off at once and under full speed, saving the all-important moments of time that would be consumed in launching from a vessel when preparing for action or when under fire. This manœuvre is possible only with the Sims-Edison Torpedo, for the reason that its propelling power is not within itself but with the operator, and, being without limit as to quantity, is never exhausted. Whereas, all other torpedoes contain their propelling power within themselves, which, being limited in amount is soon expended, and must be launched while a vessel is in front of an enemy at short range, and when preparing for action or under fire. In this connection, it should also be remarked, that while the Sims-Edison Torpedo can be used for any war-vessel, it is in the highest degree desirable that naval vessels should be built, whose principal armament should consist of Sims-Edison Torpedoes, and which should have sufficient speed to overtake the heavy iron-clads and then easily destroy them with the torpedo. Such a vessel would also form a

valuable agency for clearing a channel or coast line of fixed mine torpedoes, by the process known as countermining. *

7. SHMMARY OF PROBLIAR AND ESSENTIAL QUALITIES.

The special points of superiority of the Sims-Edison Torpedo over all others, as regards the elements of potency, efficiency, convenience, and thorough adaptability to offensive and defensive naval warfare, may be briefly summarized as follows:

It is movable, by a practically inexhaustible power, generated outside of itself, and transmitted from a place of comparative safety on the shore or on shipboard.

Its movements are directed and controlled, whether ahead, to port or starboard, in the direction of the altered or changing course of an enemy, or on its return when desired, by the intelligent will of an operator in a place of comparative safety—nothing being left to blind chance:

parative safety—nothing being left to blind chance.

Its movement to the point required cannot be stopped by any obstructions, since it may be deflected to the right or left, or it can be made to return at will, while by its own automatic action it clears the way of cables, chains, spars or

rafts, and the like, or passes under the obstructing object.

It is portable, light in weight, convenient in its dimensions, and being in four small sections is easily stored on land or on shipboard; and it can be taken apart and put together in a few minutes.

Being entirely submerged, its hull, which carries the explosive charge, cannot be reached by shot or siledl, and its float, besides being of material capable of resisting shot or siledl, opposes so minute a point to any missile as to be almost invisible and practically secure from it, while it is also greatly protected when in motion by the water that dashes over it, while serves to hide it from sight and causes missiles aimed at it to glance harmlessly aside. Yet if shot or shell should penetrate the float, it is indistructible, being filled with a buoyant substance which is impervious to water and will not sink even if the outer metalite shell is nontally destrowed.

It renders fixed minc torpedoes inoperative and clears the way of them for a fleet, when they are planted in an enemy's harbor; and it protects and defends or replaces them, when in a harbor to be defended against an enemy.

It wastly increases the effective arrangement of a vessel of wastly a new and $1^{\rm th}$ to he was the size Trepte my pursues installed acquire a thresh so wastle when the proposed change is shown if and above, we in both or made with its parage of havy we could, and she is a practice to the proposed change is shown if and only a proposed change is shown in the proposed change in the proposed change is shown in the proposed change in the proposed change

most destructive appliance, by whose agency a small, swift, sca-going launch may easily cope with and disable or annihilate the most powerful iron-clad.

It explodes at the precise point, underneath the surface of the water and below the armor of a vessel of war, where its discharge will be productive of the most destructive results.

Its "official" speed is greater, continuously, than that of any other form of topedo, and steadily increases instead of steadily diminishing as it nears the vessel of an enemy.

Its course cannot be permanently diverted by tides or currents, being always under the full control of the operator throughout its entire range of two miles.

It can be stored on shipboard, below deek, comparatively out of the reach of an enemy's guns; and as the "charge" may be put in at the moment, only when required, the vessel and crew run no greater risk of danger from its explosion than from the explosion of the "magazine" of the vessel.

8. TESTS BY OFFICERS OF U. S. ARMY.

2. 1

As early as 1870, the Sims Torpedo had engaged the serious attention and study of the most distinguished multiray mue in the United States, who ever gravely apprehensive of the dangers incident upon the exposed and defenseless condition of our coasts, harbos, and large seaboard clicks, with the result that it recommended itself to, them by its extraordinary potency and indestructibility, the incensustibleness of its move power, and the perfect control of its movements by an operator in a distant place of safety, and also by its adaptability to a wide range of application in millitary and avail operations. It was seen that this torpedo combined practical elements of power and efficiency, especially for coast and harbor defenses, that had been hitherto vainly sought for in any other torpedo appliance or association of appliances that military genius or siccultic and engineering skills had been able to devise.

In the course of the spring and summer of 1880, a number of studies of the working of the Sins fishty Torpedo were made by officers of the Blast loin of Engineers of the United States Army, stationed at Willer's Point, New York, under the immediate personal supervision and direction of Gen. Henry L Abbot, U. S. A, assisted by the inventor, Mr. NS. Sins, with the particular object in view of perfecting some minor details having reference to alther paractical application of the torpedo in var. These practical studies were made in connection with an experimental Torpedo Boat made for the United States Government and paid for by it.

These studies, and the experiments that were conducted in connection with them, so clearly revealed the efficiency of the Sims Torpeich, that can, in the same year, on September 22 and 24, and a month later, on October 88, of three official runs of it were made, respectively, by eleven and ten official of the Battalion of Engineers, under the supervision and direction of General Abbot, Lieuz-Co. of Engineers, Par's Hing-Gen. U. S. A., commanding the School of Application. The "official" reports of these runs, with the accompanying charts and descriptions, are appended as follows:

SIMS ELECTRIC (FISH) TORPEDO,

Made at Willel's Point, N. Y. H., on September 22, 1880. THE RUN was made and the records taken by eleven officers of the Battalion of Engineers, assisted by four non-commissioned officers and twelve

Stations established at 15 seconds apart by chronometer, and triangulation at distant station regulated through telephone. A small error in time probably occurred at station 12.

TRIANGULATIONS made by four officers at each theodolite (base-line 1255.8 feet)—one following the fish with telescope, two reading the verniers, and one

recording. STRENGTH OF ELECTRICAL CURRENT determined by an Obach galvanometer, read by an officer.

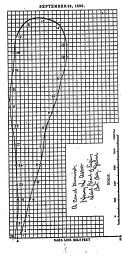
REVOLUTIONS OF DYNAMO MACHINE automatically recorded on chrono-

Times of Steering electrically recorded on chronograph by an officer—shown by the heavy lines on the plot of the run.

FISH TORPEDO piloted by an officer and steered by the inventor. DETAILS OF THE RUN.

				-	
eation.	Time after	Dynamo Machine (Weston No. 5). Revolu- tions per Current.	Dis- tance between stations.	Speed per hour.	Remarks.

	Time	(Weston	No. 5).	Dis- tance	Speed	_
Station.	after starting	Revolu- tions per minute.	Current.	between	per hour.	Remarks.
No.: 2 3 4 5 6 7 8 9 10 11 12 13 11 15 16 7 18 19 20 21 22 23 24 5 26 27 8	m. s. 0 00 15 30 45 1 00 15 30 45 4 50 15 30 45 4 50 15 30 45 4 50 4 50 15 30 45 5 00 15 30 45 4 50 4 50 4 50 4 50 4 50 4 50 4	1154 1147 1154	webers. 28.55 38.02 42.60 45.57 40.99 44.30 46.11 45.20 42.60 42.60 44.30 44.30 44.30 44.30 44.30 44.30 44.30 44.30 44.30 44.30	215 220 241 217 237 228 244 243 230	miles. 0 1.41 8.32 9.86 1.92 9.82 10.86 9.91 12.00 17.54 10.31 10.95 9.97 10.05 10.96 10.77 10.05 10.96 10.97 11.05 11.0	



OFFICIAL RUN OF THE

SIMS ELECTRIC (FISH) TORPEDO, Made at Willet's Point, N. Y. II., on September 24, 1880.

THE RUN was made and the records taken by eleven officers of the Battalion of Engineers, assisted by four non-commissioned officers and twelve privates.

STATIONS established at 15 seconds apart by chronometer, and triangula-tion at distant station regulated through telephone.

TRIANGULATIONS made by four officers at each theodolite (base-line 1255.8 feet)—one following the fish with telescope, two reading the verniers, and one recording.

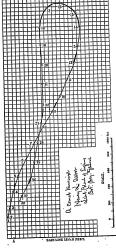
STRENGTH OF ELECTRICAL CURRENT determined by an Obach galvanometer, read by an officer. REVOLUTIONS OF DYNAMO MACHINE automatically recorded on chrono-

Times of Steering electrically recorded on chronograph by an officer—shown by the heavy lines on the plot of the run. FISH TORPEDO piloted by an officer and steered by the inventor.

DETAILS OF THE RUN.

	Time	Oynamo Machine (Weston No. 5).		Dis- tance	Speed	
Station	after starting	Revolu- tions per minute.	Current.	between stations.	per hour.	- REMARKS.
No.	m. s.	Rate.	webers,	feet.	miles.	The dynamo machine began to revolve a
1	0 00	0	0	0	0	to", and was stopped at 6 and 33 after th
2	15		16.95	to	0.45	order was given for starting (station 1).
3	30	800	18.20	118	5.36 8.82	The run developed a fault, exposing bar
4.	45	1062	28.55	194	8.82	copper near the middle of the cable.
5	1 00	1125	34.07	204	9.27	Between stations 3 and 27, a distance of
3 4 5 7 8	15	1169	36.63	214	9.73	5441 feet, the fish moved at an average rat
7	30	1169	36.91	226	10.28	of 10.3 miles per hour—the dynamo machin
8	45	1177	36.91	226	10.28	making 1153 revolutions per minute.
.9	2 00	1169	36.91	226	10.28	The total number of revolutions of the screen
10	15	1169	36.63	210	9.54	propeller (pattern C) was 5055; the total dis
11	30	1169	38.02	228	10.36	tance traveled was 5645 feet (over a mile).
12	45	1169	38.02	236	10.68	1
13	3 00	1177	37 - 33	210	9.54	
14	30	1177	37.33	192	10.64	,
16	45	1177	36.63	220	8.73	
10	4 00	1136	36.63	220	10.00	
17	15	1162	36.63	256	11.61	· ·
10	30	1160	36.63	220	10.00	
19	45	1185	36.63	249	11.32	
21	5 00	1169	36.91	236	10.73	
22	15	1177	36.91	200	11.82	
23	30	1147	36.63	232	10.54	
24	3245	1162	36.63	244	11,00	
25	6 00	1154	36.63	- 246	11:18	
26	"15	1124	36.63	230	10.46	
27 28	30	1171	35.98	228	10.36	
28	45		0	76	3.45	

SEPTEMBER 24, 1880.



OFFICIAL RUN

OF THE

SIMS' ELECTRIC (FISH) TORPEDO,

THE RUN was made and the records taken by ten officers of the Battalion

of Engineers, assisted by four non-commissioned officers and twelve privates.

STATIONS established at 15 seconds apart by chronometer, and triangulation at distant station regulated through telephone.

TRIANGULATIONS made by four officers at each theodolite (base-line 1255.8 feet)—one following the fish with telescope, two reading the verniers, and one operation

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STRENGTH OF ELECTRICAL CURRENT determined by an Obach galvanometer, read by an officer.

REVOLUTIONS OF DYNAMO MACHINE automatically recorded on chronograph.

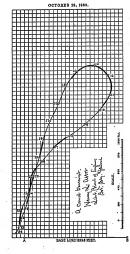
graph.

TIMES OF STEERING electrically recorded on chronograph by an officer—shown by the heavy lines on the plot of the run.

FISH-TORPEDO piloted by an officer and steered by the inventor.

DETAILS OF THE PIN

Station	Time	Dynamo Machine. (Weston No. 5).		Dis-	Speed		
	after starting	Revolu- tions per minute.	Current.	between stations.	per hour.	Remarks.	
No.	m. s.	Rate.	webers.	feet.	miles.	The unusual strength of electrical curren	
1	0 00	0		0	0	shown in this run was not due to any fault in	
2	15	325	18 64	24	1.09	the cable. The speed did not equal that	
3	30	928	34.07	126	5.72 8.68	promised by the half runs of September 2	
4	45	1072	52.26	192	8.68	and October 21, 1880, with the same propelle	
3 4 5 6	1 00	1127	48.02	206	9.36	(pattern D). Possibly both anomalies wer	
6	15	1201	53.46	222 .	10.08	caused by some escape in the fish itself befor	
8	30	1217	50.06	232	10.54	the motor was traversed by the current; al	
8	45	1217	50.06	224	10.18	though none could be detected by inspectio	
9	2 00	1192	48.02	236	10.68	after the fish was opened. The internal con	
10	15	1185	48.02	248	11.28	nections had been slightly modified prior t	
11	30	1170	48.02	224	10.18	the run.	
12	45	1177	48.02	246	11.10	The dynamo machine began to revolve a	
13	3 00	1184	48.02	224	10.18	about 10 seconds, and was stopped at 5' an	
14	15	1184	48.02	224	10.18	31" after the order was given for starting (sta	
16	30	1155	45.20	224	10,18	tion I).	
10	45	1162	46.11	240	10.90	Between stations 5 and 23, a distance of	
17	4 00	1189		224	10.18	of 10.4 miles per hour—the dynamo machin	
18	15	1177	46.11		10,18	or 10.4 miles per nour—the dynamo machin	
19	30	1140	44.30	224	10,10	making 1174 revolutions per minute. The total number of revolutions of the	
20	5 00	1141	42.60	238	10.00	screw propeller (pattern D) was 3860, th	
21		1148	42.60	224	10.18	total distance traveled being 4782 feet,	
	15	1189	42.60	214	9.72	total distance traveled being 4702 feet,	
23	30		42.00	80	3.24	1 1	
24 25	6 00		0	40	1 82		



9. A FURTHER CRUCIAL TEST BY U. S. OFFICERS.

In further exemplification of the efficiency of the Sims Torpedo, and in especial to test the indestructibility of its float, the power of the torpedo itself to resist concussion, and its ability to safely withstand artillery fire, two years later than the tests just described, General Abbot subjected it to an additional series of tests, on September 19, October 26 and November 2, 1882, of which the following is his official report:

OFFICIAL TESTS OF THE

SIMS ELECTRIC TORPEDO

Made at Willet's Point, N. Y. H., by Brev. Brig-Gen. Henry L. Abbot.

HEADQUARTERS, BATTALION OF ENGINEERS,) WILLET'S POINT, NEW YORK, December 10, 1882.

Mr. W. S. SIMS, New York City.

DEAR SIR: On September 19, 1882, the float of your torpedo, made in 1881, was anchored in front of a 32-pdr. howitzer. It was fired at five times at 1001, was aucmored in front of a 32-pdf. howtzer. It was itred at five times at a range of 370 yards, and eight limes at a range of 180 yards, with dombis-shotted canister charges, each containing ninety-six balls. The accompanying bloograph illustrates the severity of the test, [See appe 27). The large holes were made by this fring. The float work adout a mile by a steam-hunch at a rante of five miles per hour. On its return it had

lost only 150 pounds of its 400 pounds buoyancy, and was perfectly serviceable for use in an attack.

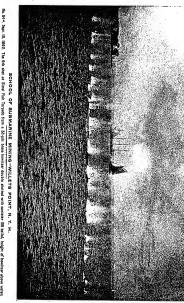
nor use in an attack.

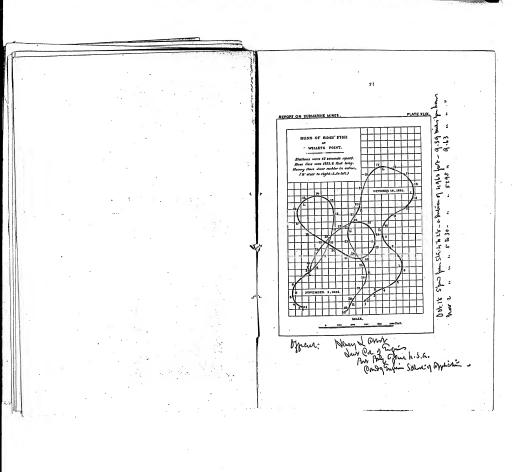
On October 26, 1882, experiments were made to test its power of resisting concussion. The mast of a schooner, 56 feet long, and 17 inches in diameter at the foot and 13 inches at the head, was anchored by two 50-opound anchors—one at each end. Your torpedo was driven against this obstruction twice, once

one at coale ciril. Vour torpodo was driven against this obstruction twice, once moving at rate of 75 milles per bour. And once at 80.1 miles per hour. Notitier sheek did any dwinnings. The torpode on both cases dived under the Transport of the Company of the C

Lient. Col. of Engineers,
Brot. Brig-General U. S. A.
Commanding School of Application. [See opposite page.]

F (96 bells)





Still other tests of the Sims Torpedo were made at Willer's Point, by Gen. Abbot, on Jine, 61, 884, the object being to try its steering power and to exhibit the facility with which, at the will of the operator, it could be made to exhibit the facility with which, at the will of the operator, it could be made to estible as offers, to pursue any desired irregular connect, to reverse its course, or to cause it to return to its starting point. These trials fully demonstrated were considered to the case and accuracy with which the toppedo could be made to strike any desired object, and at the same time pass under any obstruction. On the above date Gen. Abbot caused as par, 27 feet long and 17 inches daimeter, to be another off Willes's Point, a quarter of a mile from the torpedo station. On the first trial to tropedo struct the spar squaredy in the middle, the point aimed at, and then dived under it. The course of the torpedo in this trial is shown in Disargmant p. 3.5 on the second trial the torpedo struct the spar within eighter inches of the same spot, after which it passed under the obstruction and continued on its way. Its course on this trial is shown in Diagram at p. 3.5.

10. OPINIONS OF GENS. M'CLELLAN AND ARROT.

In this connection the following letters from the late Gen. George B. Mc-Clellan and Gen. H. L. Abbot have a public interest:

NEW YORK, November 22, 1882.

To the President of the Sims Electric (Fish) Torpedo Co.: .

DEA Sine acpt to general grant grant grant pleasure in stating that DEA Sine in exploy so you fingularly. I keek great pleasure in stating that DEA Sine in exploration of the subject of topedoe. If is high ability, scientific acquirement, and long experience in charge of the army topedo station, pre-eminently quality lim to decide upon the merits of any preferred system. His perfect decided by the property of t

Let me add, that, without pretending to be thoroughly conversant with the subject, I am strongly impressed by the conviction that the Sims' is the best of the movable torpedoes yet invented.

(Signed)

Very truly yours,
GEO. B. McCLELLAN,
Maj.-Gen. U. S. Army.

(EXTRACTS FROM LETTER OF DECEMBER 15, 1882.)

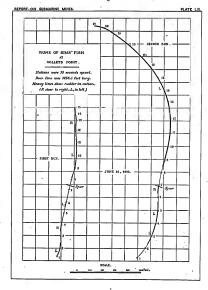
The dangerous range of your torpedo. A charge of 290 pounds of dynamic, submerged at the depth requisite to develop its maximum intensity, would produce the control of the

(Signed) Very respectfully yours,

Very respectfully yours,

Lient. Col. of Engineers, Bot. Brig. Gen. U. S. A.,

Cont. of School of Application.



11. OFFICIALLY RECOMMENDED BY U. S. A. OFFICERS.

After the above-described trials, runs, and artillery and other tests had demonstrated the energy and efficiency of the Sims Electric Torpedo, the inventor, naturally desirous that his own country should have the first opportunity to avail of its advantages for immediate application to harbor defense, on December 6, 1882, addressed a letter to the Board of U. S. Engineers for Fortifications, at New York, in which he offered to build for the United States Government a "war model" of his invention, on certain prescribed conditions; and on December 14, 1882, the President of the Board, General Z. B. Tower, U. S. A., reported officially to General H. G. Wright, Chief of Engineers, U. S. A., at Washington, the tenor of Mr. Sims' proposal, and the conclusions that had been reached concerning it by the Board of Engineers, of which he was the president, in a letter of which the following is a copy:

> OFFICE OF BOARD OF ENGINEERS FOR FORTIFICATIONS, ETC., NEW YORK, Dec. 14, 1882.

Brig.-Gen. H. G. WRIGHT, Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL—On behalf of the Board of Engineers I have the honor to enclose herewith a letter from Mr. W. Scott Sims, dated Dec. 6, 1882—in which he proposes to construct a "War Model" of his Electrical Torpedo Boat, arranged to carry 11,000 feet of cable, etc.—and to submit the following remarks thereon :

The experimental Torpedo Boat, made for the Government in 1879-80, was intended for frequent runs and for successive modifications, as trials suggested improvements. For this reason it was constructed with dimensions sufficient only to carry only one mile of cable.

Experiments with this boat have been continued at Willet's Point during

the seasons of 1880, 1881 and 1882. They have included-

1st. A study of the new problem of electrical transmission of power.
2d. The determination of the speed attainable with different forms of pro-

3d. The test of the details of the mechanism-electrical and mechanicalemployed in the boat. 4th. Practical trials to determine the efficiency of the protection used

against artillery fire. 5th. Practical trials to determine whether the boat possesses the requisite

stiffness and strength to resist concussion against a heavy spar when moving at full speed, etc. The result of this investigation has been to convince the Board that this torpedo should form a part of our system of harbor defense, and that we are prepared to intelligently construct a war-boat carrying two miles of cable.

The Board therefore recommends that this proposition of Mr. Sims be accepted, the funds to be supplied from the appropriation for torpedoes for harbor defense, of which a sufficient amount is available.

Respectfully submitted, (Signed)

Z. B. TOWER, Col. of Eng'rs and But. Major-Gen., President of the Board.

In accordance with the recommendation of the Board of Engineers, at New York, as reported by General Tower, the proposition of Mr. Sims was accepted, and he furnished the Government a war-boat carrying two miles of electric cable, which was paid for out of an appropriation that had been previously voted for torpedoes for harbor defense.

The next step in the history of the Sims Torpedo was to invite the direct attention of Congress to this important agency for the national defense. Accordingly, on January 26, 1883, the Secretary of the Sims Electric Torpedo Company presented a memorial to the Secretary of War, Hon. Robert T. Lincoln, which, after reciting the recognized advantages of torpedoes, and the thoroughly unprotected condition of American harbors, sea-coast cities, etc., closed as follows:

Your petitioner would therefore respectfully request that you will recom-Tour petutioner would interested respectfully request that you will recommend an appropriation by the present Congress, to be expended by the Board of Engineers, U. S. Army, at its discretion, for the purchase of submarine movable fish-torpectoes, controllable from and propelled by power from shore-stations, of model approved by the said Board of Engineers of the Army of the Tighted Circ. United States

By order of the Secretary of War, this petition was, on the same day, referred to the Chief of Engineers of the United States Army, at Washington, and on the day following was by him referred to the Office Board of Engineers for Fortifications, etc., at New York, for report and recommendations at an early day. On January 29, 1883, the last named Board reported, as follows:

> OFFICE BOARD OF ENGINEERS FOR FORTIFICATIONS, ETC., NEW YORK, January 29, 1883.

Respectfully returned to the Chief of Engineers.

Respectively returned to the Chief of Engineers.

Our system of so-coast defense is based:

It Upon so obstructing the channels of approach to our great sea-ports

and harbors, by stationary mines, operated by electricity, as, while permitting

the free passage of our own vessels, to close them against an enemy.

24. Upon such land batteries and modern rifle ordnance of heavy calibre

with the continuer of the

as shall render it impossible for the hostile fleet to approach and remove the

3d. Upon such controllable fish-torpedoes as shall be able to cope, not only with war vessels of the first-class, but also with special armored boats designed to open a passage through the obstructed channel by countermining, etc.

Fish-torpedoes, therefore, form a recognized part of our system of defense, and in the present incomplete condition of our batteries, and the total lack of heavy rifled ordnance, their importance for us is greatly enhanced.

We are, therefore, of the opinion that a sum of \$200,000, or a larger sum, if Congress sees fit to grant it, can be used with great advantage in the construction of controllable fish-torpodoes, unhampered by conditions as to time of disbursements.

Respectfully submitted on behalf of the Board-(Signed) IOHN NEWTON.

Col. of Eng'rs, But, Mai. Gen. President of the Board

The memorial was then returned to the Secretary of War, by the Chief of Engineers, Brig. and Byt. Major-General A. G. Wright, with the above indorsements, and also with an indorsement inviting the attention of the Secretary to the views expressed by the Board of Engineers, above given, and emphatically adding in which I concur. And thereupon the Secretary forwarded the petition, with the indorsements thereon, to the Appropriation Committee of each House of Congress, accompanied by the following letter:

Sin—I have the honor to invite your attention to the indoored copy of a communication from Ozer Manifall, and the indoorements thereon of the Board of Engineers, in which it is recommended that an appropriation of \$200,000 at least should be made for the construction of control find the state of the construction of controlled find to the control of the control of the control of the control of controlled find to the controlled find to th

pedoes, unhampered by conditions as to time of disbursement.

I believe that the particular kind of torpedo mentioned in the within com-I believe that the particular kind of torpean menution is considered by engineer officers to possess great excellence; but if Congress should see fit, as I urgently recommend, to make an appropriation for this general purpose, I would prefer that the department be not restricted by the form of the appropriation to any particular kind of torpedo, so that if a better one should be found before the disbursement of the appropriation, it could be adopted.

Of the great necessity for adequate provision for defense of this character I think there can be no doubt.

Very respectfully, your obedient servant ROBT. T. LINCOLN,

(Signed) Secretary of War. To

Hon. WM. B. ALLISON, Chairman Com. on Appropriation,

U. S. Senate. Since the presentation of the above petition and its reference by the Secretary of War to the Appropriation Committees of Congress, that body has appropriated \$187,500 to the purchase and construction of Sims' Torocdoes. and in conformity therewith, eight torpedoes have been contracted for by the Government, making a total of ten, that up to this date (January 1, 1886) have been contracted for by the U. S. Government and have either been furnishep or are in process of construction.

12. THE SIMS-EDISON TORPEDO COMPANY.

The Sims-Edison Tornedo Company of New York, which is the owner of the important invention that has been described in the foregoing pages, has secured patents for the invention from every European and American Government, and is now prepared to negotiate for the sale of its torpedo or for certain of its patent rights. The latest improved machinery which the company has made or is now making, to fill orders received from the U.S. Government, has established the fact that the speed of the Sims-Edison Torpedo will be materially increased and will probably reach several miles an hour in excess of its best records in the past.

The company is now prepared to receive and fill orders, and to make contracts to manufacture and supply the Sims-Edison Electric Torpedo Boats complete, of the most approved pattern, with the latest improvements and best electrical apparatus, and capable of running one, two or more miles.

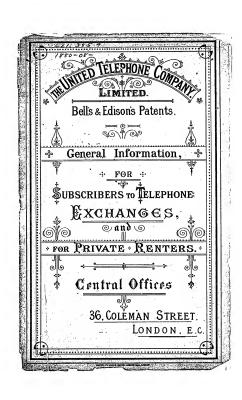
It has made contracts with the Edison Machine Works of New York (the largest shop in the world for the manufacture of electrical machinery), and with the Armington & Sims Engine Company of Providence, R. I. (also the largest shop in the world for the manufacture of the special class of engine which the electrical machinery requires), and with other large firms for the manufacture of boilers, etc., that enable it to insure to its customers the lowest price for the particular machinery to fully equip the shore end of the system.

Estimates will be given for stations for running any number of boats at any one time, also for the supply of war materials, electrical machinery, cables, etc., etc.

United Telephone Company, Ltd.

This folder contains printed material issued by the United Telephone Company, Ltd. Organized in London in 1880, this company brought together the patents of Edison and Bell through the merger of their respective London telephone companies — the Edison Telephone Company of London, Ltd. and the Telephone Company, Ltd.

The following item has been filmed: "General Information for Subscribers . . ." (1880).



The United Telephone Company,

BELL'S and EDISON'S PATENTS.

Gondon Exchange Sintions.

36. Galardo Strutt, E.C.; 77. Gondon, E.C.; 11. Greek Virtual Striet, E.C.; 10. Galardo Strutt, W.C.; 20. Galardo Strutt, E.C.; 10. Galardo Strutt, Strutt, E.C.; 10. Galardo Strutt, E.C.; 10. Galardo

Phovincial Exchanges.

MANCHESTER, BOLTON, LIVERPOSE, GLAMOW, BRIMINGHAM, SHITTITE, OLDHAM, BRISTOL, DENBEZ, EDINBURGE, LEITH, SCHREBLAND, GREENOCE, BELTAST, DUBLIN, WHINES.

Chairman, JAMES BRAND, Esq.

Beputy-Chairman, The Right Hon. E. P. BOUYERIE.

VISCOUNT ANSON.
J. W. BATTEN, Esq. C. W. PLEYDELL BUUVERIE, Esq. C. G. G. B. DEWIRDST, Esq. J. S. FORIBES, Esq. Solidaratib.

CAPT. R. H. HOME.
W. CUPHIBERT QUALTER, Esq.
CHARLES SCHIPP, Esq.
LIEUT.-COL. C. E. WERBER, R.E.
Su. P. R. WODEHOUSE, K.C.B.,
G.C.S.L.

Banhers, NATIONAL PROVINCIAL BANK OF ENGLAND. Messes, ROBARTS, LUBBOOK & Co.

Auditors,

Messus, QUILTER, BAIL & CO., 5, Mongate Street, E.C.

Messus, PRICE, WATERHOUSE & Co., 44, Gresham Street, E.C.

Solicitors.

Messas. Ashurst, morris, orisp & Co., 6, 0M Joney, E.C.

Messas. Waterhouse & Winterbotham, 1, Now Court, Carry Succe.

Şecretary. ARNOLD WHITE, Esq.

Chief Office: 36, COLEMAN STREET, LONDON, E.C.

All Communications to be addressed to the Secretary,

WATERLOW & SOME LARITED, PRINTERS, LONDON WALLS, LONDON,

THE UNITED TELEPHONE COMPANY,

LIMITED.

(BELL'S & EDISON'S PATENTS.)

This Company is established for the purpose of bringing within the reach of the public the use of the Telephone in all the operations of government, commerce, and daily domestic life, so that conversation can be carried on between two persons at any distance apart, without the intervention of a third person.

The entire success of the system of Telephone Exchanges, by which all persons wishing to communicate orally with one another at a distance are enabled so to do at short notice with perfect secrecy and with the use of the smallest number of communicating wives, obliges the Telephone Company to lose no time in establishing Exchanges in all parts of the United Kingdom, wherever a sufficient number of subscribers can be found who are willing to avail themselves of them.

The Company are prepared to take immediate steps to establish an Exchange, wherever twenty subscribers can be found within a circle of two miles diameter, and where no extraordinary difficulties for the erection of wires are encountered.

The subscription will secure to each the use of apparatus suited to the situation, or to the particular requirements of the subscriber. The patents possessed or worked by the Company include the use of the best appliances. One of the downtages of the system is, that, like the water or gas, which are laid on to a dwelling, the Telephone will be fixed, and all the facilities of the newest inventions provided, for an annual rental or subscription, which can be terminated and resumed with reasonable notice.

For domestic purposes Exchanges can be connected with cabstands, telegraph-offices, police-stations, fire-stations, shops, &c.

In order that Telephones for exclusive private use, between house and house, may be within the reach of the public at the lowest cost compatible with good maintenance, the Telephone Company will provide and maintain speaking-apparatus within a radius of one mile of all their Exchanges at a low annual rental, with a slight increase for each additional mile of such radius.

This increased charge will be reduced whenever new Exchanges are opened at a diminished mileage distance.

The principle the Telephone Company propose to adopt in the extension of their system, is, to attract the sympathies, interest, and co-operation of the public in each locality where their appliances are used, and to enlist the assistance of local influence in the management.

Under the headings (see page 6) "Subscriptions to Exchanges," Rentals of Private Station," Rentals of Private Lines for Telephones, is described the manner in which the Company propose to charge the public. The first refers to those stations which are connected with Exchange centres, by which the subscriber can converse with all other stations connected with the same centre. Under the second and third are scales of charges for Private Lines, framed to extent to the public the use of the Telephone at a minimum cost.

The Company, in restricting their operations to the letting of apparatus within the United Kingdom, will secure to their customers the advantage of the use of the newest and best forms of apparatus, and further, save them all trouble as to the setting up, the maintenance, and the removal of the same.

SUBSCRIPTIONS TO EXCHANGES.

Each annual subscription for a Station, in connection with a Telephone Exchange, is £20, within a radius of one mile from the exchange; the subscription, beyond that distance, to be the subject of special agreement in each case.

At this charge, each subscriber will be provided with the following apparatus, and one such set constitutes a Station:—

- t Transmitting Telephone. Separately
- 1 Receiving Telephone.

 1 Bell and push, or other means of calling.
- 1 Battery (if necessary).

Any reasonable additions or alterations to the above, renderednecessary for efficiency of hearing, by the abnormal condition of locality or by the physical necessities of the subscriber, will be made without altering the subscribion.

Additional apparatus, within the Station and on the same line, above those required to establish the station, will be charged for at additional rentals, similar to those published on page 6 for private lines,

Additional Stations on the same line, or on separate lines, communicating with the same exchange, will be charged, to the same subseriber for his bonâ fide use, at reduced rates, to be agreed on in each case.

Special arrangements will be entered into, when it is desired that action should be made to serve two or more subscribers who are neighbours. In special eases the Company will not object to placing two subscribers on the same wire, at a reduction of rental to each of 25 per cent.

Subscribers will be required to pay for the cost of alterations,

For domestic purposes Exchanges can be connected with cabstands, telegraph-offices, police-stations, fire-stations, shops, &c.

In order that Telephones for exclusive private use, between house and house, may be within the reach of the public at the lowest cost compatible with good maintenance, the Telephone Company will provide and maintain speaking-apparatus within a radius of one mile of all their Exchanges at a low annual rental, with a slight increase for each additional mile of such radius.

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At this charge, each subscriber will be provided with the following apparatus, and one such set constitutes a Station:—

1 Transmitting Telephone.	Separately
1 Receiving Telephone.	or
1 Bell and push, or other means of calling.	combined.
1 Battery (if necessary).	

Any reasonable additions or alterations to the above, rendereduccessary for efficiency of hearing, by the abnormal condition of locality or by the physical necessities of the subscriber, will be made without altering the subscribtion.

Additional apparatus, within the Station and on the same line, above those required to establish the station, will be charged for at additional rentals, similar to those published on page δ for private lines.

Additional Stations on the same line, or on separate lines, communicating with the same exchange, will be charged, to the same subscriber for his bona fide use, at reduced rates, to be agreed on in each case.

Special arrangements will be entered into, when it is desired that one station should be made to serve two or more subscribers who are neighbours. In special cases the Company will not object to placing two subscribers on the same wire, at a reduction of rental to each of 21 per cent.

Subscribers will be required to pay for the cost of alterations,

RENTALS OF PRIVATE STATIONS.

The annual rental for private Stations is calculated on the actual cost of maintenance, and as this will depend on the distance of the Station from an Exchange Centre,

The charge will be :-

At or within a radius of one mile from an Exchange ... £3

For each additional mile 10 per cent. in addition.

For this charge will be provided the same set of apparatus as constitutes an Exchange Station.

For separate additional parts of the apparatus the charge will be at proportionate rates. $\label{eq:continuous}$

When a large number of stations are rented by one person or corporation, for their own purposes, a percentage will be taken off the above rates, which will be agreed on in each case.

The private Stations will require the use of private lines, for which the annual charge will be:--

In Town, at or within a radius of one mile of an Exchange.

Miles.

Overground £2. £3. 10s. £6.

Lines beyond the above radius, lines on special poles or lines

presenting special construction or wayleave difficulty, to be subject to special agreements for rentals.

An agreement must be signed, in all cases, before extensions are

commenced, and a deposit equal to half a quarter of the rental, be paid at the same time, which will be returned when the subscription or rental ceases.

Each agreement will provide for a minimum duration of rental

fact agreement will provide for a minimum duration of rental of instruments or station apparatus for one year, and of that for lines for three years.

The Company reserves to itself the right to decline undertaking any Telephone Lines for which they may receive application.

All rentals to commence from the quarter or half-quarter day following the opening of the line or station, and they will be payable inal-yearly thenceforward, on the 30th June and 31st December in each year.

Merchants, solicitors, bankers, managers of companies, and others acquainted with the ramifications of large business operations are aware that the Telephene does not enable them to dispense on all occusions with the necessity for personal conference. Much correspondence, and many telegrams and messages, however, become needless when the opportunity of oral communication is even than.

Insurance Offices, with branches or agencies in various parts of the Metropolis, and Banks, are examples of the class of business in which the capacity for immediate and secret communication increases the capacity for the transaction of affairs.

The experience of the brokers in the metropolitan produce markets since the introduction of the Telephone Exchange system during the past year has demonstrated the fact that business can during the past year has demonstrated the fact that business can during the past year has demonstrated the fact that business can the systematic development of telephone Exchanges.

The union of the Company's system with the Docks already in existence, and the Exchange centres opened or about to be opened, is evidence to the shipping interests that the telephone partakes not so much of the character of a luxury, as of that of an indispensable necessity; and the Company are now perfecting such arrangements as will afford facilities to merchants and shippers for prompt communication between the city and the bonded and other whares on the river-side, and, if necessary, between the shore and temporary stations on board skips in dock.

In order to said those engaged in business connected with perishable goods, such mark-tegration produce, fish, meat, and general supplies for hotels and other large establishments, the Company are prepared to make arrangements for connecting any two stations in communication all night, if so desired; and, where the necessities of business suggest the arrangement, exchanges will be open until a late hour of the night, or even during the whole twenty-four hours,

Nor are the advantages indicated by the description of the commercial uses of the Exchange centres limited to the metropolitan area. Exchange stations will be opened in the neighbourhood of London and other large towns.

By this means commercial men will have conferred upon them the advantage of oral communications with their offices, as well as with focal centres, shops, &c. Work, which would involve wear, and expensive travel, will be transacted at home. The morning's post may be opened in the city, letters read through the telephone, and replies dictated in the same manner, thus effecting a saving of valuable time, and improving the conditions of life necessarily imposed on a man of business.

Even in the case of those who are not much engaged in affairs, or who from physical or other cause are confined to the house, the telephone by economising time creates the opportunity for repose. It is needless to dwell on the value to the heads of familities of the power of oral communication with the medical man, with tradesmen, or with cooperative stores; and it is equally needless to enlarge on the manifold services which the telephone is able to render to other classes of the community.

The benefit conferred by the power of immediate access to distant correspondents cannot be said to be purchased dearly at a cost little exceeding a shilling a day.

LIST OF SUBSCRIBERS TO EXCHANGE SYSTEM.

A.

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Anderson, Weber & Smith 9, Mineiug-lane
Audrado, Joseph 49, Barbieau
Anglo-Swiss Condensed Milk Co. ... 10, Mink-lane
Angle-Universal Bonk ... Coleman-street House

... 11, Lime-street

Arbuthuot, W. R., & Co S2, Great St. Helen's		Detriti-Cologno Tire Histimnee Com-	
Argenti Bros 4, Anstin Friars		mmy of Berlin 45, 46 & 47, Co	ornhill
Argles, Rand, Bailey & Co 85, Gracechnrelt-street		Bevan, Harris & Garrard 117. Bishonson	
Armytage, Porcy 8, Copthall-buildings		Bovis, Russell & Co 8A, King Willis	am-street
Ashnest, Morris, Crisp & Co C, Old Jowry	1.1	Birch & Archer 8½, Angel-ec	ourt, Throgmor
Atkinson, Geo., & Co 66, Aldersgate-street	1.4	Street Street	-
Australian Lloyds 2, St. Michael's House,	Cornhill	Bird, C. E 4, Change-alley	
Australian & New Zealand Under-	1	Birkbeek Bank Southampton-b	
writers' Association 84, Leadenhall-street		Bishop, W. H 1, Royal Exchai	
	1	Blades, East & Blades 11, Abchurch-h	
	1.1	Blamayon Iron Co 86, Cannon-stre	
		Blockey, A., Greig & Co 75, Old Broad-s	treet
		Bolling & Lowe (formerley Wm. Bird	
	. 38 1	& Co.) 2, Laurence Pon	ntnoy-hill
		Boot, A., & Son 24, Old Builey	•
В	1 19	Besauquet, Curtis & Co 23, Rood-lane	

			D	
Bailey, Daniel				10, Draners'-gardens
Bailoy, Parker & Wel	lesley			28, Rood-lano
Bailtie, J. R				St. Margaret's House, Victoria-s
Ditto				15, Old Bond-street
Balme, Oharles, & Co.				19A, Coleman-street
Baltic, The				Threadneedle-street
Banbury and Cheltenl	ham Di	reet R	ail-	
way Company				8, Drapers'-gardens
Barber Bros				32, Feneliureh-street
Barlee, E. H., & Burg	cess .			9, Finsbury-eirens
				10, Great St. Helen's
Barnett, W. H., & Co				28, Threndneedle-street
Bath, Henry, & Sons				Gresham House
Baxters & Co				5, Victoria-street
Bayley, James A.				120, Camon-street
Bayley, J. C., & Co.				1, Qaeen Victoria-street
Benchcroft & Gordon				4, Tokenhouse-yard
Beaton Bros				2, Great Winehester-street
Bell, Alexander & Co.				37, Seething-lane
Bell, J. T., & Co.				2, Lower Thames-street
Bell, John				118A, Southwark-street
Bellairs, W. G., & Co.		'		8, Drapers'-gardens
Bennett, Piercy & Co.				20, Tooley-street
Bouskin, Thos.				Castle and Falcon Hotel
	,., .			St. Olave's Wharf, Southwark
Bergheim, J. S., & Co.				18, Laurence Pountney-hill
				-,

ngel-court, Throgmortone-alloy nton-buildings Exchange-buildings ureh-lune on-street Broad-street ee Pountnoy-hill niley Leadenhall House Boursot, A., & Co. ... 9, Hart-street, Mark-lane Boustend, E., & Co. 84, Londonhall-street Bonteher, Mortimore & Co. 9, Leather-market, Bermondsey Bouverie, the Right Hon. E. P. ... 17, Moorgate-street Bower, Edward, & Co. ... 184, Penchurch-street Bowles, George 13, West Smithfield Bowley & Bristow ... 34, Leadenhall-street. Bowring, Jamieson, & Co. 7. Eust India-avenue Bridshaw, John, & Co. ... 4, Bishopsgate-street Withia Brand, Robert, & Co. ...

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Buckfustleigh, Totues and South Devon Railway Company 1, Drapers'-gardens ... 18, Laurence Pountney-lane

Budgett, James, & Son

Bueues Ayres and Ensened	a Port	Rail-	
way Company, Limited			8, Drapers'-gardens
Bulloch, J. & G., & Co.			18, Fenchurch-avenue
Burchell, William			5, Broad Sanetuary, Westminster
Burt, Boulton & Haywood			64, Cannon-street
Burt, F., & Co			71, Cornhill
Buttery, John, & Co			17, Trinity square

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Conston, Sir Joseph, & Sons 47, Eastebenp Contral Nows Office Ludgate-circus Central Wales and Cormarthen Junetion Railway 1, Drapors'-gardens

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... Dunster House, Mineing-loue ... 18, Bishopsgate-street within ... 16, Leadquhall-street

... Mineing-lane

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... 51, Poll Mall

... 8, Newman's-court, Cornhill

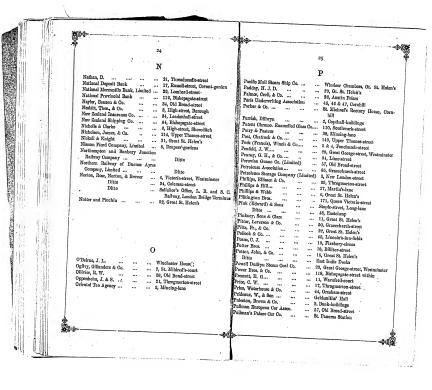
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Tarnhull, Alexander, & Co. ... Stocken, J. A., & Co. ... ··· 74. Old Broad-street ... Suffolk-lano ... 27, Leadenhall-street Straker Brothers & Co. ... 35, Camomile-street Straker, S., & Sons 25, Line-street ... 124, Fenchurch-street Turner, Brightman & Co. ... Stranss, A., & Co. 15, Great St. Helen's ... 16, Rood-lane Tyers, Thompson & Co. Street, G., & Co. ... 29, Mineing-lane ... 30, Cornhill Tylor & Mann Stuart Brothers & Co. 11, Queen Victoria-street ... 5, East India Avenue Stuart, J. M. Boulah-hill, Norwood Stumore. Weston & Co. .. 31, Leadenhall-street U u S. S. Co. ... 11, Lendenhall-street United Telephone Co. (Limited) Secretary ... 36, Column-street Tamyaco & Co. General Offices... ... 5, Fenchmelt-street Ditto Tapp, A. M. ... Metropolitan Manager ... 4, Great George-street ... 11, Queen Victorin-street Tatham & Co. ... Engineer 35, Pudding-lano ... 10, Old Jewry Chambers Taylor, Bathell & Roberts in Bros. 110, Fenchurch-street ... 109A, Camon-street Ditto East India Docks Taylor (Wm.) & Duttridge ... 18, Duke-street, Loudon Bridge Taylor & Sou i, Field-court, Gray's inn Temple, The London Terrell & Honey 70A, Aldermanbury

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v

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... 84, Leadenhall-street Waikato Land Assoc. (Limited) ... 70, Lower Thames-street Walker, Howard & Co. 17, Anstin Friara ... 86, Cannon-street Wallis, J. J. Waltons, Bubb & Walton Leadonhall House, Leadenhall-street ... 15, Lower Whitecross-street Walton, Turner & Walton 1, Bell-yard, Gracechurch-street Ward, George 58, Holborn-viaduet Ward, H. S., & Co. Brook's-wharf, Upper Thames-street Warner, R. 133 & 184, High-st., Whitechapel Warren, Bodle & Co. Warrington, John T. 25, Tooley-street ... 1, New-court, Carey-street Waterhouse & Winterbotham... Waterlow & Sons Limited 25. Great Winchester-street

... 49, Parliament-st., Westminster Ditto... Watson, Edwd. ... 108, Bishopsgate-street Watson, Medill & Co. 29 Mark-lane Watts, Ward & Co. 85, Gracechurch-street ... 252, Tooloy-street Webb, Joseph R., & Co ... 9, Fonchurch-street Westeott & Laurance West Somerset Railway Company ... 8, Drapors'-gardens Whatley & Co.... 18, Mineing-lano ... Dunstor House, Mineing-land White, Binnio & Co. White, John 26, Great St. Holen's White, J. B., & Bros... ... 85, Graccolurch-street 31

Wild, Thomas, & Co. 88, High-street, Borough Willans, Ovorbury & Co. ... 8, Copthall-buildings Williams, Brown & Elmslio ... 9, Billitor square Willson's Wharf ... Southwark Wilson, Smithett & Co. ... 41, Mineing-lane Withorby & Farloy 15, Philpot-lane Withorby & Co. ... Nowman's-court, Cornhill Ditto 325, High Holborn Withers, J. 1, Shortor's-court Wood, Field & Hunbury ... 25, Mark-lano Wool Exchange (Col. A. A. Croll) ... Coleman-street Woodhouse, C. M. & C. ... 30, Mineing-lane *** Woolf & Jacobs "The Marquis of Granby" Tavern. St. Kathorino's Wharf Woolf, Michael ... 3, St. James's-place, Aldgate Woolston & Becton 6A, Anstin Friam Wright Brothers & Co. ... 8, Great St. Helon's Wyman & Sons 74. Great Open-street Wynne & Son 31, Lincoln's-invefields

v

Yeals, Acocks & Copeman ... Hibernia-chambers Young, J. Russell 16, Fleet-street.

TRADES LIST.

MERCHANTS.

... 117. Leudenhall-street Abrahams, Mark Adamson, Gilfillan & Co. ... 2, Billiter-avenue Adams, W., & Co. 26, Bishopsgate-street Agelasto, A., & Co. Sontlisen lionse Allen Bros. & Co. Albion-place, London-wall ••• Alston, Hamilton & Co. ... 22. Mineing-lane Alt, W. J. 14. Queen Victoria-street ... 16, Philpot-lane Anderson Brothers Andrade, Joseph Bayley, James A. 49, Barbican ... 120. Cannon-street ... I, Queen Victoria-street Bayley, J. C., & Co. 2, Great Winchester-street Benton Bros. Bell, John 118A, Southwark-street Bevis, Russell & Co. 3A, King William-street Bosniquet, Curtis & Co. 28, Rood-lane Bonstead, E., & Co. Bower, E., & Co. Bowley & Bristow 84, Londenhall-street ... 134, Fenchurch-street ... 84, Londonhall-street ... 4, Bishopsgate-street Bradshaw, John, & Co. Brand, R., & Co. 7, Union-court, Old Broad-street Brunn, S. P., & Co. 16, Philpot-lane ... 54, Leadenhall-street Brown, W. H., & Co. ... Bulloch, J. & G., & Co. ... 13, Fenchurch-avenue Buttery, J., & Co. 17, Trinity-square Caudery, W., & Co. 151, Fenelmreh-street Campbell, L. A. 7. Jeffrey's square Campbell, Shearer & Co. ... 70, Great Tower-street 14, Laurence Pountnoy-hill Carter, H. & A. 4, Bishopsgate-street Carvill, Francis, & Son Cater, J. W., Sons & Co. 89, Lombard-street Chalmers, W. B., & Co. ... Dashwood-house, New Broad-street
Clark, Charles, & Co. ... Windsor-chambers, Great St. Helen's ... Windsor-chambers, Great St. Helen's ... 47, Basinghall-street Cohen. A. & E. 148, Londenhall-street ... 41, Threadneedle-street Cotesworth & Powell Coulon, Berthoud & Co. ... Cutbill, Son & de Lungo 87, Old Jewry ... 4, Mineing lane Daniel, Thos., & Co.

8

Maotoggart, Tidmon & Co. 30, Loodenhall-street McCaul, Gilbert J., & Co. 27. Walbrook McEwan, Jas., & Co. 27. Lombard-street ... 30. Leadquhall-street Malcolm, W. F., & Co. Manning, William Oke, & Son ... 40. Lower Thames-street Mee, G. Brooko 9A, Great St. Helon's Megaw & Norton 12. Pancras-lano Meior, C. G., & Co. 16. Philpot-laue Molchors, Rungo & Co. ... 1. Penchurch-avenue Mendel, Moritz 153, Lendenhall-street Merton, H. R., & Co. 118, Londonhall-street Mosenthal (Julius) & Co. 1. Beer-lane, Great Towor-street Muir, H. B., & Co. 26. Old Broad-street Navlor, Beuzon & Co. 34. Old Bread-street O'Beirno, J. L. Winehester-house Ogilyv, Gillanders & Co. ... 7, St. Miklred's-court Padday, H. J. D. 29, Great St. Helen's Pennoy, G. H., & Co. 84, Lime street Power Bros. & Co. 118, Bishonsonte-street Pulesten, Brown & Co. ... 2. Bank-buildings Ralli & Mayrojani 25, Finsbury-circus ... 117, Bishopsgate-street Richards, Tweedy & Co. ... 2. Finch-lene Robinson, Fleming & Co. ... 21. Austin-friera Rogers, G. F. 5, Great Winehester-street Rellins, J. G., & Co. Old Swan-wharf, Upper Thomes-st. Rushten Bros. 18. Lime-street Sandeinan, G. G., Sens & Co. ... 20, St. Switbin's-lano Sauders Bres. 25, Abehurch-lane Schwann & Co.... 6. Moonente street Scott & Co. 8 - Triollino

35

Scaright, James, & Co. Sechiari Bros. & Co. ... Shaw, Finlayson & Co. Silva (Brune) & Son Simson Bros. Sinclair, Hamilton & Co.

Smith, Geo., & Co. ... Smith, Wood & Co. ... Stanes, Watson & Co. ... Steel Bros. & Co. ... Strauss, A., & Co.

6. Rost India-avenue 16, Reed-lane

5. Fonchurch-street ... 11 & 12, Great Tower-street

Tamyaco & Co. Tolme & Rungo

... 7. East India-avenue

... 88, Bishopsgate-street

... 35, Crutched-friars

... 17, St. Helen's-place

... 34, Fenchurch-street

... 114, Fouchurch-street

... 14, Londenhall-street

4. Cullnm-street

... 3, Adam's-court

... 29, Gresham-hopso ... Hayno-street, Charterhouse-square 32, Great St. Helon's

11. Old Brood-street

... 11, King's Arms-yard

... 11. Now Broad-street

... 7, St. Helon's-place

... 21, Mineing-lane

... 1, Fen-court

14, Mineing-lano

... 23. Cld Brond-street

... 1. Fenchurch-avenne

... 31, Lendenhall-street

... 4. Bank-buildings

... White Lion-court, Cornhill

... 9, King William-street

... 60. Graceeluvely-street

... 15, Bishopsgate-street

13, Austin-friars

... 123, Bishopsgute-street

... 65, New Broad-street

... 17. Lendenhall-street

... 79, Gracecharch-street

... 12, Tekonhouse-vard

... 60. Fenchmelt-street

... 65. Fenchurch-street

... 6. Great St. Holen's

... 48, Moorgate-street.

... 1. Fonelurch-evenue

... 7. Eest India-avenue

... 16, Great St. Helon's

... 0, Fen-court

... 5. Great Winghester-street

... 50, Threnducedle-street

... 16. Philpot-lane

... Jeffrey's square

... Dunstor-house

... 19, Billiter square

... 8. Finch-lane

... 28. Crntched-frings

... 6, Jeffrey's-square

6, Tokonhouse-yard

... 20, Great Winchester-street

... 1. Riohes-court, Lime-street

Langridge, Henry, & Co.

Lanvon & Co. Lowisohn & Co.

Knypors, C. ...

Dent Bros. & Co. Dent, Polmor & Co. ...

Dowhurst, Geo. & R. ...

Dobreo, Sannel & Sons

Eldor, A. L. ... 4...

Englehardt, F., & Co. ...

Ernstlansen & Oesterley

Evans, J. H.

Eves. C. W., & Co. ...

Faming, W., & Co. ...

Findley, Durham & Brodie ...

Finlay, Jas., & Co.

Finlay, Campbell & Co. ...

Floershoim (Louis) & Co. ...

Forbes. Forbes & Co.

Ferwood Bres.... ...

Fraser, J. & L., & Co.

Gibbs (Anteny) & Sons

Gillospie, A. M., & Co.

Gray, Dawes & Co. ...

Harvey, Brand & Co. ...

Hayn, Roman & Co. ...

Holland (Arthur) & Co.

Hellway Bros.

Horsloy, Kibble & Co....

Husov, R. A., & Son ...

Ingall, W. T. F. M., & Sons ...

Isanes, M., & Sons

Kennard (Stephen) & Co. ...

Jimenez, A., & Sous ...

Johnston, E., Son & Co.

Knowles & Foster ...

Kœbel, Jameson & Co.

Kümners, Brust ...

Huth, Frederick, & Co.

Herne, F. G. ...

Hecksher & Pearson

Grahams & Co. ...

Elins & Co. ...

Leon Bross

... 19, Water-lane ... 7, Fenchurch-street

Tuken, Morre & Co. 27, Londenhall-street Manning, Collyre & Co. 541, Farenhamb-street Manning, Collyre & Co. 541, Evantum-sharteet Manning, Collyre & Co. 541, Evantum-sharteet Marchall & Percula 14, Minding-lano Moca, Bewre & Co. 21, Minding-lano Moca, Bewre & Co. 21, Minding-lano Moca, Bewre & Co. 21, Minding-lano Marchanut, From. 14, St. Leffent's plane Pally & Pantum Bolis & Lancock 21, Minding-lano Robert Beas	
Acunia, d. 3, 4, 5, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,	
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Arbuthnot, W. R., & Co	
Bailey, Parker & Welksley 28, Rood-lane Townend, Alexander Dunster-house	
Paulsin Prop. 99 Poushwell street	
Wilson, Edward 108, Bishensgate-street	
Devini, Hattis & Co 18 Mineing-lous	
Brookes & Frith 25, Mineing lane White, Binnie & Co Dunster-heuse	
Carry & Browns	
Clark, Ansted & Co 13a, Philpot-lane Witherby & Farley 15, Philpot-lane	
Coles, E. G., & Co 25, Mineing-lano Woodhouse, C. M., & Co 30, Mineing-lano	
Colman (Clement) & Co Dunster-house, Ameng-lane	
Corrio & Co 17, Little Tower-street	
Cox, Patterson & Co 121, Penchureh-street	
Czernikow, C 29, Mineing-lano SHIPOWNERS AND BROKERS.	
Dalton & Young 29, Mineing-lane	
Drake, J. V., & Co 11, Mineing-lane Anchor Line of Steamers 19, Leadenhall-street	
Garrard & Niemann Dunster-house, Mineing-lane Anderson & Co 5, Fenchurch-street	
Goetze & Asser 21, Great Tower-street Barnett Bros 10, Great St. Helen's	
Grant, Chambers & Co 37, Fenchwell-street Bowring, Junieson & Co 7, Bast India-avenue	
Green & Pitt Dunster-house, Mineing-lane Capel, A. J 4, Royal Exchange-buildin	105
Griffin, John, & Sou Dunster-house, Mincing-haue Carvill, Francis, & Sou 4, Bishopsgato-street	-
Halo & Son 10, Fouchuredi-avenue Clarkson & Co 20, Billitor-street	
Harmen, J., & Co 14, Mineing-lano Cory, Lohdau & Jackson 6, Crosby-square	
Harvey (Sydney) & Co 27, St. Dunstan's-hill Culliford & Clark 32, Great St. Helen's	
Hindley, W., & Co	hia
Hindley, W., & Co	hin
Hindley, W., & Co	hin
Hindley, W., & Co	shin
Hindley, W., & Co. G2, Queen-street De Rin & Alack Hornity, Remethy's & Co. G3, Queen-street Becoule Dron. & Co. G. Ball India servano Galle & Christic G. & G.	thin
Hindley, W., & Co. 62, Queen-street De Rin & Alack 118, Bishepapato-street Will Horsely, Henselyk & Co. 90, Great Tower-street 16 & Clinitide 17, Marie-lane 18, Marie-lane 1	thin
Hindley, W., & Co. G2, Queen-street De Rin & Alack Hornity, Remethy's & Co. G3, Queen-street Becoule Dron. & Co. G. Ball India servano Galle & Christic G. & G.	thia

Lake, A. R., & Co.

Grey, H., Jun. ... Griffiths, N., Tate & Co.

.... 81, Gracceltureli-street Harria & Dixon ... 11, Lendenhall-street Hay, J., & Co. 10. Lendenhall-street Honderson Bros. ... 146, Leadenhall-street. Houlder Bros. & Co. ... Jones, R. G., Price & Co. 1. Church-court, Clement's-lane ... 16. Great St. Holon's Languidge, Henry, & Co. Rost India-chambers Laws, Surtees & Co. ... McIlwraith, McEacharn & Co. ... 34, Leadenhall-street Marshall, Arthur 31, Eastelienn Milburn, W., & Co. 1. Billiter-avenue Mosses & Mitchell 51, Gracecharch-street Pacific Mail Steam Ship Company ... Great St. Helen's Pinkney, Sons & Clare... 11. Great St. Holen's Potter (John) & Co. 15, Great St. Helen's Rugg, C. H., & Co. 82, Bishopsente-street Scrutton, Sons & Co. ... Skinner, Thomas, & Co. 9, Gruccelmreh-street ... 7. East India-avenue Smith, W., & Co. 106, Leadenhall-street Stumore, Weston & Co. ... 84, Leadenhall-street Tatham & Co. 35. Pudding-lano Taylor, Bothell & Roberts ... 116. Fenchurch-street Turner, Brightman & Co. 15. Great St. Helen's Tylor & Manu 5, East India-avenue Union Steamship Company 11, Lendenhall-street Walker, Howard & Co. 70, Lower Thames-street Watts, Ward & Co. 85, Gracechurch-street. Westcott & Laurance 9. Fenchurch-street White, John 26. Great St. Helen's Wright Bros. & Co. 3, Great St. Helen's Potter Bros. 18. Billiter-street

DOCKS COMPANIES AND WHARFINGERS.

... 60, Graccelturch-street

... 2, Lower Thames-street

... 9, Minoing-lane

... St. Olave's-wharf

Alexandra (Newport) Dock Co.

Anderson, Weber & Smith ...

Bell, J. T., & Co.

Bereaford & Co.

Brock's Wharf ... Upper Thames-street Cook, J. W. 80, Bury-street 22. Commercial Sale-rooms Hall & Douglas Hicks, Nash & Co. Pickle Herring-wherf ... Honro, Wilson & Co. Danster-house, Mineing-lane Kobble, Son & Co. Bull-wharf Knill, J., & Co. ... Fresh-wharf London and St. Kath. Docks Co. ... 109, Leadenhall-street Ditto London-docks Ditto St. Katherine-docks Ditto Cutler-street Ditto Victoria-docks Ditto Wool-warehouse, London-docks Maior & Field... ... Red Lion-wharf Metropolitan Wharf Wapping-wall Millwall Dock Co.'s Offico ... 1, Railway-place Smith, W. M., & Sous... ... Smith's wharf, Queenhitho Warner, R. Brook's-wharf Williams, Brown & Elmslie 9, Billiter-square Wilson's Wharf Southweek

RAILWAY COMPANIES.

Kilkenny Junction Railway Co. ... 1, Drupers' gurdens

... 8, Drapors'-gardens

Hayling Railway Co.

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ļ	40	41
	Linavick & Karry Railway Co 6, Wecaminter-chambers, shares London, Chathana & Dowe Bullery Co. Yeartis-station Materopolitus Bullery Co	Hinghes, Chemory & Gold James, Mon James & Binkequence James & Good James & James
	METAL TRADE	Hogers, IJr., Soma & Co. 13, Londonball-street Handleas & General Horn Company Service Sarpont, W. T., & Sona 5, G., Chamos-street Sarpont Services 15, G., General Vincolarates' arceet Sarpo & William 11, S. B. Benet's place Sonro, A. J 11, S. D. Genet's place Sonro, A. J. D. Genet's place
	Campone, A. Frienris, C. Co	COAL TRADE

TEA TRADE

	TEA	T1	LADE.
Canel (Arthur) & Co			1, Danstor-court, Mineing-lane
Cassoll, Smith & Co			80, Fenchurch-street
Edwards & Harris			12, Great Tower-street
Edwards & Son			24, Fenchurch-street
Goddard, Jas., & Co			12, Little Tower-street
Bonndry & Co			181, Upper Thames-street
Hancock Bros, & Carey			28, Mineing-lane
Hewett, W., & Co		•••	7, Arthur-street West
Ilone, C., & Son			24, Eastelieap
Maonaghten & Stapleton			8, Mineing-lane
Moffatt & Co			28, Fenchurch-street
Moffatt & Heath		• • • •	38, Mineing-lane
Oriental Ten Agency			3, Mineing-lane
Peek, Fras., Winch & Co.			3 & 4, Fenchirch-street
Reinnelis, Nephew & Co.			5, Rood-lane
Shepard & Co			25, Mineing-lane
Theodor & Rawlins			10, Mineing-lane
Thompson, W. J. & U.			38, Mineing-lano
Tyers, Thompson & Co.			29, Mineing-lano
• • •	ovis	tor	TRADE.
			Hibernia-elambers
Anderson (Joseph) & Son		•••	20 Toolov-street
Bonnett, Piercy & Co.		•••	13. West Smithfield
Bowles, Georgo		•••	9. Half Moon-passage, Whitechupel
Brown, Geo., & Sons	•••		251, Tooley-street
Courtenay, J. & W. J.		•••	Hibernia-chambers
Denny, T. A., & Co		•••	9 & 10, High-street, Whitechapel
Dixon, Carter & Co			Hibernia-chambers
Eastty & Corderoy		•••	Hibernia-wharf
Hayes, E	T 114		2, Drapers'-gardens
Kopf's Extract of Meat Co.	Limite	u)	28, Hearn-street
Ditto			187, Houndsditch
McCall, John, & Co			Wellington-chambers
Matterson, O'Noil & Co.	•••		Hiberun-chambers
Miller & Halls	•••	•••	3, High-street, Borongh'
Nesblit, Thos., & Co		•••	25, Charterhouse-street
Reynolds, Sona & Co			24, St. John's-street, Smithfield
Sloane, Wolls & Tuylor			
Tuylor (Win.) & Dottridgo	•••	•••	18, Dake-street, London-bridge 188, High-street, Whitechmel
Warren, Bodlo & Co	•••		
Wobb, Joseph R., & Co.	•••	• • •	252, Tooloy-street
Warrington, J. T		•••	25, Tooloy-street Hiberuis-chambers
Yeats, Acocks & Copeman	•••		1110eriini-olininuors

WINE AND SPIRIT TRADE.

Alluntt, Jua, & Co.				50, Mark-lano
Bourset, A., & Co.				9, Hart-street, Mark-lane
Brett, Hy., & Co.				26 & 27, High Holborn
Campbell, Charles S.,	& Co.	(Limite	d)	17. Mark-lano
Gee, Walter				10 & 12, John street, Adelphi
Greenlees Bros.				31, Commercial-street
London Co-operative	Wino 2	sociati	011	10, John-street, Adolphi
Mile End Distillery (Zo.			86, Mile End-road
Potter Bros				70, Dilliter street

LEATHER TRADE.

Anning & Cobb		 11, Lime-street
Boutcher, Mortimore & (lo	 9, Lenther-market, Berme
Dyster, Nulder & Co	***	 6, Crosby-square
Good, Rigg & Co		 10, Mark-lane
Heydemann & Co		 22, Harp-lane
Lawrence, Fredk. Tunner		 36, St. Thomas-street
Leather Exchange		 Bormoudsov
Schweder & Co		 59, St. Mary-axo
Smith & Charles		 Southsea-house

OIL TRADE.

Nicholson, Jus., & Co.		 214, Upper Thames-street
Nickoli & Knight		 21, Great St. Helen's
Nutter & Pinchin		 82, Great St. Holen's
Petroleum Association		 85, Gracelureli-street
Potroleum Stornge Co. (Lin	ited)	 8, Now London-street
Phillips & Wobb		 C, Great St. Holen's

CORN TRADE.

 Bell, Alexander, & Co.
 37, Seething-lane

 Ichenhauer, J., & Co.
 36, Mark-lane

 Lyous Granary.
 Upper Thannes-street

 Marcus & Co.
 59, Mark-lane

 Stephenson & Co.
 4, Museovy-court

 Waton, Modill & Co.
 29, Mark-lane

HOP TRADE.

Wild, Thos., & Co. 15, Lower Whitecross-street Wild, Thos., & Co. 33, High-street, Borough

SUGAR REFINERS.

 Dunieau, James
 ...
 9, Mincing-lane

 Mambré Saccharine Company
 ...
 110, Cannou street

 St. Lucia Central Sugar Factory
 ...
 8, Drapora-gardens

 Limited
 ...
 ...
 14, Mineing-lane

WHOLESALE GROCERS.

Budgett, Jas., & Sen 18, Laurence Pountacy-lane
Honderson & Liddell 126, Cannon-street
Travers, J., & Sons 119, Cannon-street

WHOLESALE CONFECTIONERS.

Castell & Brown 88, Wardom-street
Clarke, Nickells & Coombs Hackney-wick
Pink (Edward) & Sons ... Staple-street, Long-lane

WOOL TRADE.

Balrac, Class, & Co. 19., Coleman-street Edenberough & Co. ... 2, Moorgato-street buildings Willaus, Overbury & Co. ... Moorgato-street chambers Willaus, Overbury & Co. ... 3, Coptabliabilities Wool Exchange Coleman-street

WHOLESALE DRUGGISTS.

Allen & Hanbury Plough-court, London-d-street
Atkinson, Geo, & Co. 66, Aldersgate-street
Branz, Escher & Webb 60, Bart holomore-close
Howard & Sons Mitro-squary, Aldgate
Howards & Sons Plough-court
Howards & Sons City-mill, Stratford

TIMBER TRADE.

Burt, Boulton & Haywood 64, Cannon-street
Garduor, J., & Sons 5, New London-street
Scrutton & Campbell 114, Fenchurch-street

BANKERS.

Agm Bank		 	85, Nicholas-lano	
. Alexanders & Co.		 	24, Lombard-street	
Auglo-Universal Bank		 	Coleman-street House	
Birkbeek Bank		 	Southnumton-buildings	
British Linon Co.'s B	nuk	 	41. Lombard-street	
Burt, F., & Co.		 	71, Cornhill	
Colonial Bank		 	13, Bishopsgate-street	
English Bank of Rio	Janeiro	 	18, St. Helen's-place	
Erlanger (Emile) & C	0.	 	18, Lothbury	
Green, Tomkinson & (°o.	 	82, Nicholas-lane	
Grindlay & Co.		 	55, Parliament-street	
Koyser, A., & Co.		 	21, Cornhill	100
London Banking Asso	ointion	 	57, Old Broad-street	
National Donosit Banl		 	17, Russell-street, Cover	i anulan
National Mercantile B	ank	 	29, Lombard-street	Burren
National Provincial Br	ınk		112, Bishopsgute-street	
Royal Bank of Scotlan	d .		128, Bishopsgnte-street	
Samnel, Montagu & C	D.		60, Old Broad-street	
Smith Payno & Smith			1 Lomboul atreat	

STOOKBROKERS, &c.

... 10, Tokenhouse-vard

... 30, Throgmorten-street

... 3, Copthall-buildings

... 4, Anstin-friars

Abbott, Wm. ...

Armytage, Perey

Clayton & Aston

Coubro, William

Anderson, A., & Co. ...

Argenti Bros. ...

•••	10, Drapers'-gardens
	28, Threadneedle-street
	4, Tokenhouse-vard
	8, Drapers'-gardens
	83. Angel-court
	I, Change-alley
•••	1, Royal Exchange-buildings
	18, Fineli-lane
	10, Angel-court

... 10, Augel-court
... 4gA, Warnford court
... 29, Threaducodic-street

St. Stephen's-chambers, Tolograph-st. Dancon, W. W. ... 75, Old Brond-street Eaton, R. H. ... Ellis & Co. Royal Exchange-buildings 81, Throgmortou-street Goldsmid, B. G. ... Hatton-court Gordon (Pannuro) & Co. 82. Old Broad-street Grentorox, Heyrick A. Harker, J. C. 8. Warmford-court ... 21, Threndneodlo-street Hiohens, Harrison & Co. ... 2, Royal Exchange-buildings Hollebone Bros. & Trench 161, Tokenhouse-vard Hore & Tapp Huggins, A. E., & Co. ... 18, Throgmorton-street ... 6, Warnford-court Jourdain & Pawlo ... Landan, Hermann i. Copthall-court ... 2. Drapers'-gardens Littlejohn, Alexander ... Maenicoll & Rogers 35. Gresham-house ... 78, Old Broad-street McKenna & Co. ... McNish, Alfred H. 77, Old Broad-street ... 21, Threndneedle-street Nathan, D. 21, Throgmorton-street Oppenheim, J. & S. ... Palmor (Cecil) & Co. 26, Austin-frians ... 39, Throgmorton-street ... 11, Warnford-court Phillips, Ellissen & Co. Prescott, E. G.... 17, Throgmorton-street Price, C. W. ... Quilter, W. C. 14, King's Arms-yard ... 16. Throgmorton-street Renton Bros. & Co. 11, Royal Exchange Rodman, W. II. 80, Cornhill Ross, George & Co. 75, Old Broad-street Scott, S. R. & Co. ... 18, Old Broad-street Serimecour, J. & A. 81, Old Broad-street Scrutton & Son ... 4, Warnford-court Silverston, Mark ... 4, Royal Exchange-avenno Staples, Henry Crown-buildings, Old Broad-street Stock & Share Anction Co. 14, Queen Victoria-street Stockdalo, E. 75, Old Broad street Stocken, J. A., & Co. 2, Warnford-court Thornhill, Ceell 2. Drapers'-gardons Vivian, Gray & Co. 17, Austin friam Wallis, J. B. 1, Shortor's-court Withors, J.

... 6a. Austin-friurs

Woolston & Beeton ...

DISCOUNT BROKERS.

INSURANCE COMPANIES AND BROKERS.

Adelaide Marino Assurance Company 2, St. Michael's-house, Cornhill "Agricoles" Fire Iusuranee Company 45, 46, & 47, Cornhill Allianco Marino Insurance Company... Capel-court Australian Lleyds 2, St. Michael's-house, Cornhill Australian and New Zealand Under-writers' Association... 34, Londonhall-street Berlin-Cologue Firo Insurance Com-pany of Berlin 45, 46 & 47, Cornhill Commercial Marine Insurance Co. ... 2, St. Michael's-house, Cerubill Commercial Union Assurance Company 19 and 20, Cornhill Do Bernales & Co. ... St. Michael's-house, Cornhill Frey, A., & Co. 8, Black Raven-court Haycraft & Gilfillan 8, Groot Winehester-street Hay, J., & Co 11, Londonhall-street Hemo & Colonial Marine Insurance Company 8, Royal Exchange Imperial Insurouco Company... ... 1, Old Broad-street Jones, R. G., Prico & Co. 1, Church-court, Clement's-lano Life Association of Scotland 5, Lombard-street Ditto 48, Pell Mall Lion Fire Insurence Company ... 5. Lethbury Liverpool & London & Globo Insur-ance Company } 7 & 8, Cornhill

40

Lloyd's... Royal Exchange-buildings
Londen Assurence Corporation
Merrica Insurance Company 20, Old Brood-strees
New Zeoland Insurance Company
Paris Underwriting Association
Politer Broos. 16, Cornbill
18, Billiter-street

SOLICITORS.

Argles, Rand, Bailey & Co. 85, Graecelurch-street ... 6, Old Jowry Ashurst, Merris, Crisp & Co. 9, Finsbury-eirens Barlee, E. H., & Burgess ... 5, Victoria-street, Westminster Baxters & Co. ... 5, Broad Sanctuary Burchells Clift, Fredk., LL.D. 111, Cheapside ... 10, Philpot-lane Crum, W. A., & Sen... 19, St. Swithin's lone Ellis, C. C., Munday & Co. 5, Victoria-street, Westminster Powler & Co. 1, Old Palace-yard Gedge, Kirby, Millett & Morse Kimber (Henry) & Co. 79, Lombard-street ... 10, Now-square Lake, Beaument & Leke 11, Oncen Victoria-street Laue & Monro Leonard, H. S 5, St. Peter's-alley Norton, Rese, Norton & Brower ... 6, Victoria street, Westminster Ditte 24, Coleman-street ... London Bridge Termiuns Ditto Rectory House, Cornhill Parker & Co. 68, Lincoln's inu-fields Pollock & Co. Pridenux, W., & Son Geldsmith's Hall ... 2. Suffolk-loue, Connon-street Renshaw & Roushaw Rumnoy, Howerd 18. Welbrock ... 82, Finsbury-circus Shonhoard & Sous Field-court. Grav's inn Taylor & Son 70a. Aldernumbury Torrell & Honey Wultous, Bubb & Walton ... I. Leadenhall House Waterhouse & Winterbothom ... 1, New-court, Carey-street ... 81, Liucoln's-inu-fields Wynne & Sou Morcer & Morcer, 10. Merk-lane

Ditto

10, Savile-row

BARRISTERS. Chaplin, J. C. 3, Temple-gardens Courtenay, J. Irving 7, Great Winchestor-street Horne, H. W. 1, New-square Shadwell, L. L. 1, New-square CLUBS. City Carlton Club St. Swithin's-lane City Liberal Clab Walbrook Junior Carlton Club Pall-mall Whitehell Clinh ... Parliament-street ENGINEERS, &c. Brussey, Thos., M.P. 4, Great George-street, Westminster Croll, Gol. Wool Exchange Johnson, Matthey & Co. 78, Hatton-gardon Justice, Philip S. 14,Southampton-buildings,Chancerslane Maekenzio Bros. ... 82, Mark-lano Matheson & Grant Ransomes & Rapier 32, Walbrook ... 5, Westminster-chambers Wallis, J. J. 86, Cannon-street GLASS TRADE. Champien, T. ... 171, Queen Victoria-street Goslett, A., & Co. 26, Scho-square Nicholis and Clarke 6, High-street, Shoreditch Patent Chromo-Enamelled Glass Co.... 110, Southwark-street Pilkington Bros. 171, Quren Victoria-street St. Helen's Glass Co. ... 171, Queen Victoria-street

AUCTIONEERS, ESTATE AGENTS, &c.

ACCOUNTANTS.

 Chandler, Pixley & Co.
 ...
 15, Coleman-street

 Price, Waterhouse & Co.
 ...
 44, Gresham-street

 Quilter, Ball & Co.
 ...
 5, Moorgate-street

BOX OFFICES.

Hays, Alfred 4, Royal Exchange-buildings Keitl, Prouse & Co. 48, Cheapside Ollivier, R. W. 88, Old Bond-street

SUBSCRIPTION ROOMS, &c.

Baltic, The				Threadneedle-street
Commercial Sale				Mineing-lano
Grosvenor Galler	y Libmry	(Limit	ed)	186, New Bond-stree
Hop Exchange				Southwark
Lloyd's				Royal Exchange

ATLANTIC CABLE COMPANIES.

Compagnio Française da Télégraphe de Paris à Now York 24, Royal Exchange ... Direct United States Cablo Co. ... 34, Throgmorton-street

COMMISSION AGENTS.

Candery, W. & Co.			 151, Fenchnreh-street
Funck, H. & Co.		***	 27, Leadenhall-street
Hagenbaselt & Co.	٠		 84. Fenchurch-street

DIAMOND MERCHANTS.

. "		and the second s
Edward, Geo., & Sons	 	1, Poultry
Loverson, Jas	 	20, Holborn Viaduot
Pittar, Loverson & Co.	 	50, Gracechurch-street
Posno, C. J	 	19, Finsbury-eirens
Ridpath & Ridpath	 	38, George-street, Hanever-square

STATIONERS, PRINTERS, &c.

Boot, A. & Son				24, Old Boiley
Blades, East & Blade	8			11, Abehureh-lone
Causton, Sir J. & Sor	16			47, Eastcheap
Darling & Son				35, Easteheap
Dawson, W. & Sons	•••			148, Upper Thames-street
Donnison, John & Sc	n			20, Wornwood-street
Fenner and Appletor				77, St. John-street
Fourdrinier, Hunt &	Co.			Lndgate square
Good, Henry & Sons				12. Moorgate-street
Hazell, Watson & V	inov			6, Kirby-street, Hatton-garden
Herring, Dowiek &	Hardy			81, Walbrook
Andd & Co				St. Androw's-hill, Doctor's-comp
				29, King-street, Covent-garden
Lepard & Smiths Merritt & Hotcher				2. Grocers'-holl-court
				147, Drnry-lano
Spalding & Hodge				
Spicer Bres				ro TI (Dhomes simo)
Spicer (James) & S	ons			35, Camomile-street
Straker Bros. & Co.				
Stroker, S. & Sons				
Truscott, Jas. & So				and Owner street Observedo
Unwin Bros	T 1 - 11 - 1			and a Million bushess almost
Waterlow & Sons (Limited			and the street of the sales
Ditto		•••	•••	an I count Claumbill
Witherby & Co.	•••	•••	***	now TV-d. TT-llearn

Wyman & Sons	***	•••		. 74, Gress Queen-strees

MISCELLANEOUS.

١	. Advortisors' Association (Limited)	57, St. Paul's churchyard
	American Investment Trust Co. (R. B. Rose, Secretary)	8, Throgmorton-avenue 79, Great Tower-street

Anglo-Swiss Condensed Milk C	o	10, Mark-lane
Baillie, J. R	7.,	St. Margaret's House, Victoria-street Westminster
Ditto		15, Old Bond-street
Benskin, Thomas		Castle & Falcon Hotel, Aldersgate-st
Bouverie, The Rt. Hon. E. P.		17, Moorgate-street
Cannon Brewery Co		160, St. John-street
Carlisle & Clegg		2, Great St. Thomas Apostle
Corr, J., & Sons		14 & 15, Warwick-street
Corr, J. T		Bedford-park
Central News Office		Ludgate-circus
Chubb & Son		128, Queen Victoria-street
Church, Arthur H		79, Great Tower-street
Colls & Sons		53, Moorgate-street
Colonial Co		16, Leadenhall-street
Coubro & Potter		18, Billiter-street
Conneil of the Corporation of F		roj Dimer suites
Bondholders		17, Moorgute-street
Oow, P. B., Hill & Co		46, Chemsido
	olesnlo	onemperas
Dealers		6. Arthur-street-oast
Frown Perfumery Co		97, Chenpside
Castern Agency (Limited)		9, Fenchurch-avenue
Editor of the Review		7. New Inn
Edmundson, J., & Co		19, Great George-street
Foreign and Colonial Gover		arone design unicor
Trust Co. (R. B. Rose, Secrets		3, Throgmorton-street
Fray, Barrow & Co		23, Pudding-lane
Freen, (Frank) & Co	***	198, Upper Thomes-street
Fregory & Sons		2, Kuightridor-street
Iampton & Sous		8, Pall-mall-cast
Ierbert, E. (Central News)		22, Moorgate-street
Indley, W. H., & Co		62, Queen-street
Iughes, F. A		44, Mark-lane
Iutchinson, A., & Co.		4, Great Winehester-street
udia-rubber & Gutta-percha Co.		106, Cannon-street
nstitute of Surveyors		12, Great George-street
acobs, A., & Sons		8, Russell-street, Covent-garden
unior Army and Navy Stores		15, Regent-street
Chambres & Co.		
Cino, A. M		Lombard House, George-yard 29, Ludgate-hill
Ditto		46, Lombard-street
		40, Dominiru-Street

89, Cornhill ... 87, Regent-street ... 16, Philpot-lane Land Loan and Enfranchisement Co. 22, Great George-street . 1, Drapers'-gardens London Financial Association London Stereoscopic Co. 54, Cheanside ... Guildhall

Lord Mayor, The Rt. Hou. The ... Mansion House Ditto Mercantile Trast Co. of New York ... 6, Lombard-street Now Zealand Shipping Co. 84, Bishopsgate-street ... 8, Drapers'-gardens' Nissum Fiord Co. 2, Copthall-buildings Parrish, Dillwynn 29, Great George-street Penfold, J. W. Peruvian Guano Co. (Limited) ... 57, Old Broad-street

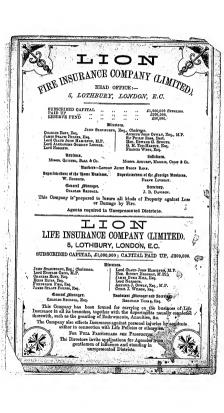
Ditto

Pulluau European Cur Association ... 57, Old Broad-street Pallman's Palace Car Co. ... St. Paneras Station ... 4, Bank-buildings Railway Debenture Trust Co. .. 85, Gracochurch-street Redwood, Boverton Society of Arts Adelphi ... 80, Comhilt

Street, Geo., & Co. 97, Cheapside Thomson, W. S., & Co. ... Thornhill, W., & Co. 144, New Bond-street

Tranways and General Works Co. ... 57, Moorgate-street Waikato Land Association (Limited) 84, Leadenhall-street Ward, George 1, Boll-yard, Gracechurch-street White, J. B., & Bros. ... 85, Gruccchurch-street

Wigner, G. W., P.C.S. ... 79, Great Tower-street



MISCELLANEOUS COMPANY RECORDS

Edison Electric Light Company Bulletins

This bound volume contains twenty-two bulletins issued by the Editon Electric Light Company during the pertoid January 1832-April 1834. These bulletins contain brief accounts of the activities of the various Edison light companies and of developments in the electric lighting industry. Included are testimonials from Edison's customers, lints of customers and types of equipment offered for sale, but the contained the customers and types of equipment offered for sale, making the customers and types of equipment of the contained the customers and types of equipment of the contained the customers and types of equipment of the customers and the customers are customers.

Much of the material concerns the central power stations at Holborn Visduce (London) and Pearl Street (New York), as well as other central stations and soluced lighting plants in the United States and abroad. The bulletins also constand escriptions of Edison's exhibits at electrical exhibitions in Paris (1881), London (1882), Chicago (1883), and Louisville (1883.) Other items describe accidents and the property of the Control of the Cont

The spine is stamped "The Edison Electric Light Co. First Series Bulletins 1-22 1882-1884." Each of the 22 bulletins is individually paginated. In addition, the entire volume is continuously paginated, beginning with page 49 and ending with page 547.

(CONTRESTIAL, AND FOR THE USE OF THE COMPANY'S AGENTS ONLY.)

FIRST BULLETIN.

The Edison Electric Light Company

NEW YORK, January 26th, 1882.

THE FIRE QUESTION. We have received a printed copy of the rules for running wires for electric lights adopted by the New York Board of Fire Underwriters, January 12th, 1882. It is said that these rules will be adopted by the National Board of Underwriters and will then be adopted by the various State Boards and City Boards thoroughout the country. That is to say, these rules will be national. They have been prepared after elaborate consultation with ourselves and the other Light companies, and are on the whole as fair as we can expect for the present. The many fires that have occurred from the are light have somewhat prejudiced insurance people, and we must suffer in consequence until the superiority of our system is established by practice. The presidents of several insurance companies, notably Mr. Edward Atkinson, President of the Boston Manufacturers Munial Insurance Co., have visited us and made a careful examination of our system. In all such cases we have satisfied parties of the complete success of our system as regards this question of tire. It only remains now for us to wait until other insurance neonle who visit us may be satisfied from the practical success of our light that there is absolutely no danger from fire.

BANTIAGO, OHILI. We have letters from Mr. Stewart, Santiago, sating that he has with the assistance of Mr. Lawrence, the engineer, installed a Z dynamo in the Variety Theatre in Santiago, and that the plant is giving the highest satisfaction.

9780

621.32765 E RIO DE JANERIO. Mr. McCarry has oncouled in successfully instailing his plant in the Edihalmion at Kio, where I is working attisfactorily. The agencies of Mesors, Publish of Cantoney. In altar city, write them as follows, under date of December 2 aris' that days write them as follows, under date of December 2 aris' that has been as follows, under date of December 2 aris' that the Edison light, we wisted the Edishibiton are runted justed with the Edison light. Bedsies the Emperor, the President of the Council of Ministers, and the Acting Minister of Pathet Works has seen the light, as well as other unportant men of the Empire, all of whom have expressed their axis.

AMERICAN ELECTRIO LIGHT CO. This new company is now spending a vast mount of money in divertising, and is reported as being about 10 light up abuilding in Boson. We have just lad a hearing on one interference on the patent office with this company, namely, spon a claim by Boshm that he was the original inventor of a certain feature in a mercury unityon need in making incandoscent lamps. Testimony has been concluded in that interference and the tentert office has decided against Boshm, and in favor of Edison.

The American Company's oscalled lump is made of two parts fitted together like a glass stopper in a bottle. The theory is that when the earloon breaks, the impre can be sent back to the factory, alkena part, and a new carbon inserted. But these two parts of the lump, innfortunedly, are not interchangeable, and, besides that, they are ast to be broken in being taking apart. Not being interchangeable, the two parts must always be kept together, because the lower part of any one brany will not work in the upper part of any other lamp. The trouble arising from data, when manthecuring of the lamps is conducted on a large scale, together with the expense of returning the lamp to the factory to be registered, and the large breaksag in garding the two parts apart, make this lamp preficiently of no value. Most of me franched believe that the American Ce, is an opponent from whom we shall have nothing whenever to fent, and from whom we shall have nothing whenever to fent, and from whom we shall have nothing. When the stock is none embaged on the publish.

new asple of socket gives out, either from being too small or from imperfect contox. The proof of the socket is a socket from the fatter as are poorly made, Also that the wood collar between the contoxet grew and outside conver of the standard socket affirms so much that it is constantly dropping out of the sockets. These matters have been a brought to the sockets. These matters have been a promised. Will our agents please report if father trouble is experienced. Plue manufactures, Imperfect goods should be removed to the are a imperfections, the imperfect goods should be returned to this in order that the may see for thisself just where the trouble is, of the proof of the sockets of the sockets are the sockets and the limit in order that the may see for thisself just where the trouble is, of the sockets are the sockets and the sockets are the sockets.

B LIOHTS IN LARGE ROOMS. Here is a suggestion from Mr. Boxusx, of Fall River. Some of our agents entertain different views on the same subject. His suggestion is copied merely for the purpose of encouraging discussion on this important topic.

"As you oduct for suggestions frame from the superiors or your agents! I need to first the following. I think it unselve to talk about II lightle in a extra mill; or other large rooms. Peoples agent about II lightle in a extra mill; or other large rooms. People suggestion and the property of the prope

PLANT AT THURBER'S. Messis, H. K. & F. B. Thurber & Co., wholesale grocers, have in their store a long narrow room over seventy feet in length and lighted only by windows at each end. In this room more than fifty clerks do clerical work all day.

The heat from the gas has proved injurious to health, and the gas light has proved injurious to eye sight. This room is now lighted by one of our isolated plants and the injurious effects of gas are entirely removed. Messrs. Therears, say that the plant gives perfect satisfaction, and that, as they express it, "It has come to

PLANT AT THE MERRIMAGN MILLS LOWELL, MABS, M. SCHOOLES, withing from the Merlimack Mills, Jonell, Mass., Felinary 15th, 839 "Every thing in connection with the electric light in the Merrimack Mills is in first rate condition, and I can suggest nothing to make it better. We have had no mishap "draw kind and there is no occasion for any. The two dynamos do their work equally and require scarced yang care."

EUROPEAN COMPANY. We have understood for some time that the European Company was toding for loadinings in the meightborhood of Paris, for the immediate manufacture of Edinon lightplant. Mr. Interaction writes from Paris under thre of january
24th, that properly was jurcleased the previous thy (January 24th,
and that he was just commercing to fit up the factory for manufactuning purposes. He enclosed a picture of of the factory representing
a large three story building, with out-buildings, situated at lvry,
on the banks of the river Seine.

PLANT AT RIO DE JANEERO. In a letter just received from Nr. McCarre, Rio de Jacoto, appear the following facts about the inotated plant, running in that city at the National Exhibition of Plantil. Mr. McCarre reached Rio December sit. The Exhibition opened December 11th. He was obliged to place the dynamo 160 feet away from the building, and also tor nu the wires a distant of 3g feet in the tablifing. It ill smatch idisant lamp

was 1,000 feet from the dynamo. He used a Z dynamo with A lamps, and align exposlight, muning 91 hunps. He was ready to light on December toth, but found that owing to having to use wire of fees than sanskard parity the light tidh not burn satisfierable. Fig. He added another wire from the dynamo to the main heilding, and starred his lights December 12th. The Emperor of Brail and all his family, inspected the light and the dynamo, and expressed themselves greatly pleased Mr. McCavrr exhibited several electives with the Impress care as immensing them under seater, and also setting up a printer's case with type for compositors to test the light.

ISOLATED PLANT AT STRASBURG, OERMANY. The following is a translation of an article appearing in a recent number of the German paper on Architectore, Cartenklati & Basternstulung. Concerning the electric illumination of the Railroad Depot at Strasburg, in Alexe, by the Ellison system, the Controllator of the

railroad administration has received the following communication. "On the 5tic inst. the arrangement already mentioned before of electric Dinamention by the Edison lamp in the Strusburg depot, went into operation, and the result so far has been a decided success. The steadiness and the color of the light surpasses aven the most sauguine expectations. Particular interest is excited by the Humination of thu refreshment rooms of the 1st and 2nd classes, far which two Sigmons differential lamps, of 150 candle power were applied until now. But the latter (the Siemens lamps) gava accasion for frequent complaints on account of the variability of the light, and its anneying spasmodic spuris, and intensive shades. The Edison lamps are attached to two chandeliers with six urnes, darived from the former illumination by gas, the arms having been inverted so that the lamps with the flat relicetors extend dawnward. The effect of the twelve lumps of 16 candle power each, in this hall af 21 metres in length and 8 metres in width, is magnificent, and calls forth the most unreserved approval. The same is to be said af the lamps in the various offices, both as regards their illuminative effect, and the preservation of pure sir. The whole arrangement was made without the assistance of the Edison Company solely by the technical resources of the Imperial General Administration of Baltronia, major the feat of the Teigraph Computer, Lik Statem, and its laterable, in consequence of the fourholder particular of the threshold of illumination, to extend it largely we reserve a more particular description of this new residelihament, together with an estimate of the cost, until after the further extension arisely in insule completed. In coordinate it skindle is excluded a raisely in land to completed. In coordinate it skindle is excluded that the merit of first haring introduced and the cost of the cost of

ATMOSPHERIC CONDITIONS. In a letter received from Mr. W. N. STRWART, in charge of our isolated plant at Santiago, Chili, mention is made of certain atmospheric conditions which are of interest. I quote from Mr. STRWART's letter.

"Smillago is 1,500 feet alrow the sea, and for five or als mottle of the year three is no real and landing a cloudy day. Thouser and lightning is unknewn, but slight shocks of centriquake are felt once in a month or two. These centriquakes constitues affect the jess inside, while has very carelessly put down. I observe that the remarked propose of the size of the contract of the contract of the propose of the size of the contract of the contr

LONDON. The following cable was received. February 10th, from London. It refers to a visit made by the sender of the telegram to Mr. Johnson's plant at the Holborn Viaduct, where one of Edison's

Mr. Johnson's plant at the Holborn Vianuct, where one of Eds central dynamos is being run. The cablegram is as follows:

"I hard very infinishi jury at Hofton Vasinic Last light, consisting of Davie Studieshod, Manying of Omaniols, Lord George Haudinos, M. F., Major George Hir Arnold Klubald, Major George Haudinos, M. F., Major George Hir Arnold Klubald, Major George Hir Huger George, Ospatha Shaw, C. D., Klufer J. Londer Hir Brigads, Profusor Ferbes, Bir Charlon Hirgh, Mr. Feder Hospith, of Hentred, and Mr. Faller, of the offert U. S. Gallon, The wishes stress highly delighted, and expressed their serious commendations of the opposition of the opposition of the control of the opposition of polyment in the control of the opposition of the control of the Quantity of the Comment of the Comment of the Comment of the Lord Capatal Falsec exhibition is generally much behind, the Edison depertunent only being in necessaria data. PLACING LAMPS. We are rapidly gaining experience as to the best way to lang lumps. The following letter from Mr. Banots, who has charge of putting an Isolated plant in the Arlington Mills, Lawrence. Mass. will in this connection be read with interest.

"To determine the loss included of plateing the large over the recoding frames as the above an lift.) I sate of language with twenty-seven A language in the dressel as follower; twenty-four on lawcakes, from parts of standard source with a dressel of a large, and on an avoided recoded and the standard source with the seven and the standard source with the containers any work, subset the invested to preference to any other loss. In conquery with the disperimendent I work among the loss. In conquery with the disperimendent I work a manage the loss. In conquery with the disperimendent I work a manage the loss. In conquery with the disperimendent I work a manage the loss. In conquery with the disperimendent I work a manage that loss are designated as a conduction of the large and the large and the loss of the large and I market that the work of large and the lar

Mr. CLARE, of the Penderton Mills, Lawrence, Mass, finds by acpretine that the A lights are beare shaped to the work them the 10 lumps. At full River, Mr. S'rescess Bonnes thinks that mea. At full River, Mr. S'rescess Bonnes thinks that mea. A map will give millicent light for free looms in watering rooms, but where we have placed the first addes, we find by experience, that they give less satisfaction than the porcelain ahades, and we are now putting in contrast and the state of the satisfaction than the porcelain shades, and we are now putting in contrast and the satisfaction than the porcelain shades, and we are now putting in contrast and the satisfaction than the porcelain shades in preference.

BREAKAGE OF LAMPS. Our experience continues to teach us that there is no unusual breakage of lamps unless they are brought pot to high, or unless the current is irregular. This experience is so uniform that the rule is well night established, that If the current is regular and if the lamps are run only at but cannel power which they are made to be burned at, there will be no unusual breakages. Also it must be remembered that allhough lamps begin to break as soon

as a plant is started, the average life will always be found to be good. For instance, in running say ten lamps in order to test the life, "it is the last four of the ten," as Mr. Edison expresses it, "that brings up the average." We have never yet known the average to fail where the current is reasonably regular and the lamps are not forced too

(CCFFIDEFIAL, AND BOX THE USE OF THE COMPANY'S AGENTS ONLY.)

SECOND BULLETIN. The Edison Electric Light Company,

NEW YORK, February 7th, 1882.

PROF. PREEDE ON THE EDISON LIGHT. The following is a juoution from an article on Electric Lighting at the Paris Exhibition, by William Henry Preece, F. R. S., of London, published in the fournal of the Sacing of Arts, London, December 16th, 1881.

"The completeness of Mr. Edison's exhibit was certainly the most noteworthy object in the exhibition. Nothing sceam to have been forgotten, no detail missed. There we saw not only the hollers, engine, and dynamo-machine, but the pipes to contain the conductors; the conductors themselves, heavy and anasalve, for Mr. Edison recognises the wasto of energy that amst occur in small conductors, the insulation, the fixtures, the brackets, the safety catches, the lamps, devices to avoid the effects of expansion and contraction through changes of temperature, meters to measure the current used, regula-tors to central the consumption of fuel." * * "Mr. Edhson's system has been worked out in detail, with a throughness and mastery of the subject that one extract sothing but onlogy from his bitterest opponents. Many unkind things have been said of Mr. Edison and his promises; perhaps so one has been serveror in this direction than mysolf. It is some gratification for are to be able to announce my belief that he has at last solved the problem that he set himself to solve, and to be able to describe to the Society the way in which he has notwel it."

THE EDISON LIGHT IN NEW HAVEN. The following is an extract from a letter written to Mr. Lowere, one of our Directors, by a friend who has no interest whatever in the Edison Company, and who visited the establishments of Messrs. Sperry & Barnes, at New Haven, Conn., for the purpose of making a perfectly impurital report on the Edison Light there.

"Mr. Sperry himself showed me about and from him I learned that the system thus for had proved most satisfactory; that he had no trouble of any sort to find with it.

He tablem a that he had been looking at the lamps of different inventors for some two years, but had not been willing to usuamy of them until he saw the Edsen.

As I understand it from him, the Editon system accomplation what mose of the others do, vir. the possibility of hashing a light over each sworkman, if inconsery, and so available admitons which with the are light would cause trouble, and more specialty where there are a number of work people. The possibility of having a light over each workman lake of course refers to the upsality of the hight which he workman lake of course refers to the upsality of the hight which he must hardward to the system of the size of the system of the must hardward to the syst. In fact all that Mr. Sperry sold to me on the snighet was in grains of the Edition system.

Mr. Sperry Is, as you may know, a most practical sort of man (a fact at once seen in the effectiveness of the arrangement of his establishment), and any praise from him on this subject, especially coming to you in this bullrest way. I thought you would be glad to know

THE EDISON LIGHT IN EUROPE. The following is a quotation from a letter just received from our representative in Paris.

"The five plants ordered to Hamburg arrived there yesterday, January 7th, and they go forward to Russela. They are all for Tamnerford, in Fluhnel, for the spluning factories there. The other one goes to the Imperial Docks at Dantzie, for their workshops."

EDBON LIORT VERSUS GAS. The gas explosion at Newat, reasks night left the Clark Thread Works in darkness except that portion which is lighted by the Edison Light. This isolated plant in the Clark Works has given entire satisfaction from the surt. The residence of J. Houde Wight, at Put Washington, (a member of the firm of Prexel, Morpan & Co.) would have been left in total darkness the other night, owing to the gas meter lawing been forcen up, ind it not been for the Edison Light. Mr. Wright lens placed an included plant in his residence, which lights the larger rooms in his house and some of the bedrooms. He expresses thinself in the most parallying terms about the success of the light. The store of Infling

& Ca., corner Leonard Street and Brouleway, has been for some time lightion with two dynamos. They have given an order for two additional dynamos (four in all), and an engine is being especially provided to: me these four dynamos. The American Bank Nose Co., of this city, is now using an is-based plant, and finds the inverted lamp just the thing needed for fine engraving work. The light has been satted in the wholestic proceys store of Thurther, in this city, but the foundation of the engine is not stiff enough and the light suffers in consequence. The foundation which has been beint up a number of feet from the ground, owing to the peculiar requirements of the building, will move he made more secure. The isolated plant in the Merrimack Mills, Lowell, Max, is giving satisfaction, the only criticals no leign, that probably whole lamps will have to be substituted for half I maps, the latter not giving sufficient light. Our isolated plants are giving good satisfaction everywhere.

GETLIWATER ISOLATED PLANT Mr. W. S. Howell, who has installed the induted plant in the Agricultural Implement Works of Seymour, Salán & Co., Süllwater, Minn., writes, under date of January g.th, that "Wiesers, S. S. & Co., do not hesitate to pre light complimate to the Elison Light; saying no chance to say a good word for the light, and duta they have really done us valuable service in ansecting letters of finuity concerning its working."

FLANY AT FALL RIVER. We received a letter from Mr. Borden dutale February 3rd, in which he speaks as follows, on the plant at the Fall River Bluechery. He says he wholes we could see the perfection of manner in which the system is working at the Bluechery, in the lands of people who only have a thorostical knowledge, and who started the system without saking a man to instruct hem. No plant anyshere could firm with more staffedion, the dynamo running alsolutely without more than the faintest indication of parks, and perfectly cool, the light being dear, heartiful and steady.

LIFE OF LAMPS. A complaint having been made that the lamps do not has a long under sonsy circumstances as under others. Mr. Upton, in cluage of the lamp factory at Menlo Park, made the following comment upon the complaint. We quote it for the benefit of others in addition to him for when it was written. Mr. Upon

"I showed the letter to Mr. Edison. He suggests that the lamps be run at a lower candle nower, and that more lamps be added to obtain the light that the larms were not intended for, 1. c. 25 to 30 enable power, in order to give brilliant effects. These effects should be obtained by the addition of more imps. Our 27 lamps put up here are certainly going to average 1,000 hours, simply because we keep them always at 16 cmudle power, and don't work the life out of them by misgoverned engines running them up at tlans to the limit of breaking. * * * There is searcely anything more that can be said. The lamps last with us for we are very careful. A lamp burning at 48 candles hats only 1-80 part as long as one at 16 candles, and the difference in the light is not exceedingly great. * * * Keeping the commutator in good condition I think has some effect. I believe that in a central station, where there are several anachines and extremely careful regulations, the lumps will last nuch loagor than they do with us. * * * Isolated plants give the hardest test to the houps, and they will always be found to last fewer hours than they do in the larger plants."

(CONFIDENTIAL, AND FOR THE THE OF THE CHAPART'S AGENTS ORLY.)

THIRD BULLETIN.

The Edison Electric Light Company,

NEW YORK, February 24th, 1882,

SERVICE BOXES FOR CENTRAL STATIONS. Regarding unader-ground service hoves in plants for central stations, Mr. Kareza in order to test the insulation has had a service box with connections and tabes complete, as used in practice, immersed in water for three months, and the insulation is unchanged.

BALDWIN LOCOMOTIVE WORKS PLANT. Our Agent writes its follows from Philadelphia, February 17th, about our isolated plant ruaning in the Baldwin Locoatotives Works.

"The lights are ransing all right at liabelwis. The dynamo inclease moved into the new quarriers set apart for electric light machines. The superfactoriest states that four harpe broken is the ranchines. The superfactoriest states that four harpe broken is the received average and that the length of time is a market proper in the property of the states. This beliege the life of the lamp squarriey upon to an exceeding average above. They are ranning the dynamo to no meaning the state of the property of the broken the property of the broken the property of the property

PLANT IN THE UNITED STATES ROLLINO STOCK COMmay's Slops. Chicago. We have received a record of the dily breakage of lamps in this plant, beginning November 22nd, and centing February 1st, together with a satement of the causes owing to which lamps gave out. The record was correctly kept in writing day by day by the Rolling Stock Company themselves. The ert result aboves 600 hours life for B lamps of hight volts, and with old sockets. The report inside to us is a follows: The United States Rolling stock lamps have shown a life of 603 hours from November 22nd, 1881, to February 13th, includes There was no breakage from February 1st to the 13th. The dynamo is earrying a lood of 13Th lamps. The plant is giving excellent

satisfaction."

RUMNING WIRES IN STREETS. The City Government of Fall River passed a resolution, February 6th, refusing to permit any one to creet poles in the streets for carrying electric light wires. The Legislature of Rhode Island have under consideration a hill for the State of Rhode Island containing the same prohibition.

ONE HUNDRED CANDLE POWER INCANDESCENT LAMP.

Mr. Ensor has a one hundred candle power incandescent lamp rauning at the Lamp factory at Menlo Park. It requires 110 odds.

Some are being made for London.

Mr. Ensor will now make some requiring a less number of volts to be run on our machine at No. 65 Fifth Assume.

EDISON'S ELECTRIC RAILWAY. The electric locomotive is initiated and is on the truck at Menho Park. It has been run over the truck and gives satisfactory resultes. The passenger car foult by Expression is also but he track. The armature of the locomotive is the armature of the 2 or 60 A light dynamo. Mr. Ediston is now constructing also a freight locomotive and freight care. This road at Nenho Park is built-across the country least of Menho Park, and is obout two and a laif miles in length. It is well grathed and will fore a practical libraration of the Edison Electric Railway. We can mail, on request, a copy of a panaphlet, a reprint of Mr. Caract's siricle of December, 1850, on the Edison Electric Railway.

IMPERFECT FIXTURES. Complaint has been made of imperfection in fixtures and sockets. Also that the safety wire in the

EVILOPIAN COMPANY. On the 3rd of January, 1884, the entire amount of capital of the Brampean Congunian, ananely three million fee hundred thousand fames, was paid into a bank in Paris. Negociations for the purchase of a factory at Paris lawe been finished and the purchase enough for that (inhependent of capital) it ready to be paid. The railrond dept on Struckurg was lighted up successfully on the evening of January 9th. A content is under discussion at Paris, for Spain. The proposed company for that constray will probably have a capital of twenty few million of frances. A proposition has been received at Paris from Ransia for the lighting up of Muncow at the coming comanist of the Cast. An agreement is nearly closed in Paris for lighting up the Western Railroad station in that city. Mr. Battechelor will law charges of the mandeturing at Paris.

LIGHTING UP NEW YORK CITY. Between six and seven miles of street mains have thus far been laid in the down town district. The bad weather has caused a suspension of laying mains for nearly a month. About six miles more mains must be laid. The third mammoth dynamo has been completed. The first one was sent to Paris where it was used during the last weeks of the exposition, The second one is now running in a building belonging to the Edison London Company, in the Holborn Vindnet, London. This third one, now completed, also goes to London Mr. Edison is satisfied with the improvements in these dynamos and will now hasten the work on the uncompleted dynamos for the First District in this city. Six will be finished first, and after they are started in the Pearl Street building, another six will be finished to be placed in the adjoining building, which also belongs to our company. The meter to be used in the first district is completed and is satisfactory. It registers with almost absolute exactness. This gives still another advantage over the existing gas system, where the meter question is one of looseness and uncertainty. No time for lighting up the Down Town District can be fixed. The work is being pushed forward with

the utmost vigor, but the unidertaking is so great, probably a few months must yet clapse before the district is actually lighted.

WIRES FOR BAFETY OATCH PLUOS. The following is a complete list of the size of wire required in Safety Catch Plugs, or to be used for a Safety Catch of any description, excepting the Safety Catch for a """ Junano.

Gauge of wire II. W. G.	Diam, in inches.	No. of Lamps.
	,020	3
25	-320	6
21	.420	9
19		12
ıS	-490	15
16	.065	
14	.085	20 10 25
13	.095	30 " 35
	400	40 ** 45
12	.120	55 ** 60

Composition of the wire, 60 per cent. Lead.

The column of lumps is for "A" or "ii" when the latter are on a "ii" line. If the "ii" lumps are on m "A" line (two in series) laif to total number of lumps will be the number in column ja. The sixes were experimentally determined and the wire will next at approximately double the number of lumps in column j. The "A" lumps give to canalog, and the "ii" lumps 8 canalogs.

COSPIDENTIAL, AND POSTINE USE OF THE COMPANY'S AMEN'S DELT.

FOURTH BULLETIN.

The Edison Electric Light Company,

New York, February 24th, 1882.

"PEDRUADY 24, 1882. .

BUGGESS OF ISOLATED PLANTS. We are receiving letters from parties useing our isolated plants, expressing great satisfaction with the light. Some of these letters are printed in this indictin, and additional ones will be printed in future numbers.

STEAMSHIP COLUMBIA. This is the first plant ever put in operation in the hands of strangers. It has now been running nearly two years, the longest test ever given to any incandescent light in any part of the world, and the following letter shows with what success.

THOMAS A. EDISON, ESQ:

Bean Sin - In answer to your request for a report upon the working of the Edbou electric light on board of the Origon Rallway and Navigation Company's attenuable "Columbia," and its solvantages for steambout lighting, I boy to solunit the following:

In 1821, while the "Colombia," which contains a large number of resource roots, was under contraction. Trasslet of Ullest control the bless of lighting each root in the voxed beingeneity by the objective light. Therefore, a given suggestion, and by the orders, I wired thoolig with number observe wire for nates and number ultrip, which is the contraction of the contraction of the colors, in the project at that time being experienced, we lighted only the passenger roots and must asslown. The objections, of which would four, one of them remained at land of the speed of the others so an octive of robotic and the colors of the colors. The objections, of which would four, one of them remained as that of the speed of the others so an octive of robotic and thirtiest, we control, of trends it may no pair of written suggines at a very high single in order to evenumber frequit speec. On the night to dat of May, 180, we started by the dynamon, and from the time when the steam was first turned on until the present they have worked to our outlie satisfaction under all circumstances.

We found the light of the greatest value for the examination of the ship's propellor, rudder or hall, which examination we conducted by connecting to a main line art, or at any convenient point, a cell of insulated wire with inspectateded to a sinker.

The first image seed, being of the paper out-on variety, were iterated in their dumber of life and see halo is a brevkage by lowery decrease; in their dumber of life and see halo is a brevkage by lowery seeds as a second of the seed of the seeds of the

The auglace being connected to the main condensor when under way, the actual copensor face consists only in the extra pint of oil cosed in interfeating outputs, styamors, etc. The supreme from read at 45 per ton is about 18 couts per hour for the one hundred and fifteen lightly. In concluding, I would say that the advantages of the electric light

In conclusion, I would say that the advantages of the electric light on beard of ships can only be appreciated by experience. Among those advantages the principal are enumerated below: 1. Economy. The light does not require the services m an atten-

- dant for triuming, lighting, etc., and there is less breakage.
- 2. Freedom from danger by fire; an matches being required.
 3. Ventilation. It is not necessary to keep doors and windows shut on account of smoking lamps or to prevent their being blowe out.
- Cleantiness and alseence of Jisagreeable odor.
 "In advantage of a non-smolling light at eight in sick rootes is manifest.

Respectfully yours.

J. C. HENDERSON,
Advising Engineer of Crogon Ratiway and
Navigation Company and Oregon and
Transcontinuntal Company."

HINDS, KETOHAM & OO., NEW YORK. A little more than a year ago, Messrs. Hinds, Ketcham & Cu., lithographers and printers of colored labels and show eards, introduced the Edison light into

their establishment, No. 449 Water St., New Yurk City, for the purpose of seeing whether they could match their colone, and do their coloned printing by artificial light. Up to that time they find been able to work only by day light. The experiment proved successful. They found they could work by our light just as well as in the day time. The following fetuer expresses the upinion of this firm about the light.

New York, February 23d, 1882.

The EDISON ELECTRIC LIGHT CO.:
DEAN SIDS—We have had the Edison system of incandescent electric lighting in our factory buildings since January, 1881, and take great pleasure in testifying to its perfection, simplicity, and the many

other good features it possesses.

We have found it to be entirely free from all the faults and objectionable features of other artificial lights, and is the best substitute for daylight we have over known and almost as cheep.

Vory truly yours,

ORANGE COUNTY WOOLEN MILLS. This is the first plant ever introduced into a woolen mill. The following letter from Mr.

Harrison shows what he thinks of it.

Newnone, N. Y., Pgs. 11th, 1882.

THE BUISES CONTANT FOR INDUSTREE LIGHTENS:

GENTLANKES—Indivisor was the first tailed great quarter for the containing containing containing containing the containing containin

TAMPS HARRISON

WINONA MILL COMPANY. This plant is in a flouring mill and is the first establishment of the kind ever fighted by an incandescent fight. The letter speaks for itself.

WINGSA, MINN., Feb. 16th, 1882.

THE EDISON COMPANY FOR ISOLATED LIGHTING, New York:

GENTARIES - Voirs of the 10th at hand and motel. We amp pleased with the Ellion tiles, it less very pleasure, storely little, and fully unscrete our purpose, for two regard It as perfectly rafe, much moteon than gas or closed interes, for it to along in prossible to little a ledelling of or cause one of the (much to be develod) explicions that Bourlay mills are made to the little and the little and the little and the little and startly slave. Developer last, and it more than most our repulsements. You never till trees for the little and little and the little and li

WINONA MILL CO.

DOLGE'S PIANO FACTORY. The following letter relates to one of our isolated plants now in use in the piano-forte factory of Mr.

New York, Feb's 18th 1882.

THE EDBOX COMPANY FOR ISOLATED LIGHTING, CITY:

Alfred Dolge, at Brockett's Bridge, N. Y.

The second section of the second section is the second section of the second

GENTLEMES—Harding now lowly your electric light in constant most any inmader milits, budget Will, Herkmier Co., N. Y. being coming to be a compected judge of the merils, I lake shorcer pleasure in dating that Radii garantees mil in september with a layling sentence shift-faction in every respect. The illinoismic of the marchine hable is, through distinction distribution of the single laungs, no perfect that there has a change of the sign of the s

The light, though very strong, is on the same then add and in a manner implement or highrous to the eye; it enables my workmen to clearly distinguish the most desilved sindings in the color of their material—an item of great importance in so size an article as someting leards for planos—as well as the qualities of the gmin, and is, in short, much better adapted to all purposes than 1 had dured to strong.

o specii must add that, with ordinary care, the apparatus seems little likely to ever get out of order, and certainly furnishes a more uniform supply of light, with less trouble and attention required, than any other system of litunisation I am acquainted with.

I expect to illiminate my new felt works at Dolgoville, which I have to complete this fall, with nothing but your electric light, and in

the meantime congratulate you arest sincorely upon your truly great success.

Yory respectfully yours, ALPRED DOLGE.

Marian Company

FALL RIVER BLEAOHERY. The first isolated plant ever introduced at Fall River, was in the Fall River Bleachery. The following letter refers to that plant.

FALL RIVER, MARK, February 21st, 1882. The Eddson Company for Isolated Lighting:

GENTLEMEN—In answer to your question concerning the Edison light at the Fall River Ricachery, I beg to say

We are running 50 of the A lights at 20 candic power, and 40 B lights at 10 candic power cach, in connection with a single Z dynamo, which you gearantee for 60 A lumps.

This single apparatus lights our entire establishment very beautifully, and a single leather belt 6 inches in width, incapable of transauting over 8 or 9 horse power, furnishes the power.

The apparatus is in charge of an intelligent carps ater is our coopley, who has had eatire care of it from the first. The light is perfectly showly and soft, our help are greatly pleased with the change, and visitors to our works greatly praise it.

One of the most conservative of our Pult River manufacturers sain on seeing our Bubblog room, where we have 45 A lights, that he had mover seein a room so beautifully lights).

When we consider that the apparatus takes less power than one of our calcuders and saves us our gas bills, which were between \$200 and \$300 for the three winter mouths, though we made our own gas, we feel there is abundant cause for satisfaction with the Edison light, and reason to congratuates all connected with the hirroduction.

Yours very truly, SPENCER RORDEN, Trens.

MANHATTAN RAILWAY OOMPANY'S BHOPS, NEW YORK GITY. The following letter shows what success one of our isolated plants is giving in the repair shops of the Manhattan Railway Company.

"DEAU Stus :-- Thu Edison Electric Light plant put in our Machine

NEW YORK, MARGH 4th, 1882.
THE EDISON COMPANY FOR ISOLATED LIGHTING.

Shops last Autumn has worked with entire satisfaction through the winter. We have not had a failure of any kind and but a very small number of lamps were broken, the cost of maintenance has been practically nothing and the cost of operation we have not been able to determine. We drive directly from main line and can not perceive any increase in the amount of fuel consumed, there no sloubt is an increase but it is very small in this case. Very respectfully,

T. W. PERPIAS

Master Mechanic

GOVERNMENT PRINTING OFFICE, WASHINGTON, We have received the first number of the Congressional Record printed by the Edison Light. 'The following telegrant from Washington to the Boston Daily Advertiser, and printed in the issue of that paper, February 25th, is a correct account of starting the light in Washington.

"Washington Feb. 24, 1882 .- At the government printing office, tonight, seventy of Ediaoa's electric lights were used as a substitute for twice that number of gas-burners used by compositors at their cases. The beautiful steady white light gave great satisfaction. At I o'clock the electric lights were turned off and gas was used for two hours. The printers were all impatient for the electric light which was again brought into use at 11 o'chiek. The lamps are very pretty in appearance, lighted or unlighted. Each one could be extinguished or lighted instantly, at pleasure, or all could be extinguished or lighted at once. It was noticable that when the gas was lighted the temperature rose several degrees, and when it was extinguished the room became several degrees cooler whith half an hear. This is an limportant consideration where so much gas is burned that ne other heat, is supplied in winter. The expense of the seventy lights is calculated at tea conis on hour, a great saving over burning gas. In calculating power for the generator one horse power is reckoned naple for seven lights. All the employees at the office expressed great satisfaction with the experiment."

MILAN, ITALY. The following ablegram has been received from Milan, Italy, "The Gmnd Foyer of La Scala (Opera House) just lighted up with ninety Edison Lights The Mayor and Eard of Aldermen have inspected the light and are delighted,"

A COUNTY AND SPECIMENTS

MERRIMACK MILLS, LOWELL, MASS., The following is an extract from an article in the Lorell Morning Times, Feb. 21st, with reference to our isolated plant in the Menimuck Mills.

"One would hardly notice the difference between this light and the ordinary gas light were it not for the hereased brilliamy and the enclosure of the light in a little pear-shaped glass globe. There are 202 lights in the room, one over each from. Those lights are affixed at one end of an irea pipe, through which from the ceiling ran the wires from the main. The mains are carefully issuiated, and are placed over the long nisies between the nunchines. All the lights are controlled from one point, though a switch may be put on each lamp, The currents are femished by two dynamo-electric machines in the insernent, consuming about 18 horse power. It is gratifying to note how completely protected these machines are from possible accident by shock to anyone near them. One of the most important, if not the coals feature of the Edison light is the protection against fire from 'he wires, and this safety is ensured by a curious means. In the are system the brilliancy of the lights is given by the passage of an electric current from a positive to a negative pole, kept slightly murt. and as the current leaps over the intervening space there is formed what is known as the voltale are. The Brush and Weston lights are examples of this class. In those system there is necessarily a curinin percentage of danger arising from the high electro-motive force used in maintaining the light. In the Edison incandoscent system the electro-motive force is only about em-thousandth part of that employed in the arc system, and, in addition to the lessened liability of danger from this source, the risk is reduced to a minimum by the use of Edison's fusible cut-off. This contrivance is placed whorever a line is tapped. The Company are well satisfied with the lights, and operalives that them very agreeable to work by. They give off ne heat, and the color of the light is but a tritle whiter than that of gas, and not at all trying lo the eyes. The lights at present in use are eightcandle power each, and the cost of maintenance is less than enothird that of eas."

The following is an extract from the Levell Morning Mail, also February 21st, about the same plant.

"The general arrangement of the apparatus is the lower weave root of Mill No. 2, where alone it has been introduced, has been fully deseribed lu the Mill, and it only remains to mention the impression made upon one who observed the working of the incandescent system for the first time, although not unfamiliar with its principles, and to refer to such new facts as were learned respecting it. Standing at one out of the room and glancing down the long rows of looms, each with its own little light placed three feet above the fabric being woven, one is list struck by the agreeable quality of the light, and next by its perfect steadiness. Filekering is absolutety impossible, and no variathat is injensity was to be noticed. These qualities are, of course invaluable in any light, and for some purposes it is plainly to be seen. the becambered electric is better than similarly, which is liable to be observed by possing clombs. The absence of heat is another valuable quality in this light. Although the little pear-shaped globes centain ing the lights are slightly werm to the touch they rediate but little if any look, and the temperature of the room, which would be ruled ten or twelve degrees by the lighting of the gas, is not influenced by the 262 electric lights. Usen approaching a loom and examining the work in process, it appears that every thread, every line of the pattern in fancy daided white goods, is remarkably clear and distinct; huperfections are quickly noticed and as quickly remedied, and it would seem that the operatives could desire no more perfect light a help them about their work. A particularly noteworthy feature of the Edlson Company is the system of "shut-out" employed wherever the main wires are topped or branches or connections made. This "shut-out" is an ingenious but very shaple contrivance by which a fusible baden wire is melled at the instant the main or branch wires become crossed or in contact with any combacting satisfance, averting all danger from the and enabling the company to make a guarantee of perfect immunity in that respect. Yet another peculiarity of the company is that he their system for lighting towns or cities, for domestic or business purposes, all the wires are conveyed under ground, in tubes especially contrived to admit of connections being made at any point desired. For house or office use, meters are provided to measure and register the current, and any single light may be extinguished by a turn of the hand without effecting may others that mao be in use, and instantly relighted in the same ma

EDISON LIGHT IN THE GRYSTAL PALAGE EXHIBITION, LONDON. We have been shown a letter from Mr. F. Ricard Scaver, F. R. S., of Edinhurgh, dated London February Sth, 1882, from which the following extract is made.

"The Crystal Phiace Exhibiting will do a great deal to advance electric lighting, and your exhibit in my immide opining does the greatest credit and hance to its organizers and will with every justice earry off the first prize. I have fropuently gone over the various

installations both there and at No. 57 Holbern Viaduct, and it is something marvellous to note the precision and perfection reigning in every little detail. Mr. Edison may be proved of list work and I trust his reward, not far distant, will be in proportion to the magnitude of bit mortis."

UNDEROROUND WIRES. A hearing has taken place this week before a special committee of the Rhode Island Legislature, regarding the proposed legislation in that State to compel electric light companies to put their wires under the ground. The leading electric light commanies were represented at the hearing. A friend of the Edison company showed samples of the Edison underground conductors, and stated that the Edison company was in favor of the proposed legislation. A representative of a prominent are light stated at the hearing, that it would be impossible for the arc lights to use underground conductors, for the reason, as he expressed it, that "a different kind of electricity, of far greater electro motive force, was required tor the arc light, from what was required for the Edison Incondescent Light, and that there was no method of carrying this different kind of electricity underground." Reference was made to the vast number of fires caused by the arc system, and especially to the fact that over eighty fires have already been caused in Philadelphia alone, by are lights, many of which occurred in the Pennsylvannia railroad depot in connection with the arc lights in that building. On the other hand, it was said (and it is a fact), that although the Edison electric light is now burning in more than fifty factories and public buildings in the United States, and in nearly as many more outside of . the United States, there has yet to be the first fire from the Edison

PEARL STREET STATION, NEW YORK. The frost is out of the ground, and the laying of the underground conductors in our



FIFTH BULLETIN.

The Edison Electric Light Company

(These bulletins, originally issued as a enterenient way of answering the inspites of olitant agents, are now, in response to numerous respects, each also to all stackboders, together him information of the progress of the Company and of other natitest of greater orders interest connected with electric lighting. Agents are particularly responsed to communicate to the Vice Problets whatever pencilar points of general interest may be developed by their experience in installing or operating our light.

New York, March 17th, 1882.

Mr. EDISON'S AWARDS AT PARIS. The company has obtained officially a statement of the awards made to Mr. Edison at Paris by the recent "International Congress of Electricians." - The Congress subdivided its work among juries, to each of whom certain special subjects were assigned. The highest possible award the Congress could give was a Diploma of Honor, that being higher than a Gold Medal. The final award to Mr. Edison, made by the several juries, was three diplomas of honor, two gold medals and a silver medal. Pursuant to usage, however, the Congress reserved the right to reorganize awards, so as to give to each exhibitor the highest award which he had received in any one class, and the Congress therefore approved the recomendations of the juries, and itself awarded a diploma of honor to Mr. Edison. Altogether there were only eleven of the highest possible awards (the diploma of honor) granted by the full Congress, and of these only two were given to Americans, namely, one to Mr. Edison, and the other on account of the telephone. The only diploma of honor awarded for an incandescent electric light

was awarded to Mr. Edison. In addition to the foregoing awands, Mr. Edison received from the French Government the decuration of Officer of the Legion of Honor. He had been previously made Chevalier of the Legion of Honor, but the hucher rank of Officer was conferred on account of his exhibit at the Taris Exposition.

PLANT IN THE HOPEL EVERETT, NEW YORK CITY. The Hotel Execut, formerly "Cross', 26 Catalans News, is inglued by an Edison isolated plant. There are one hundred and one lights in the entire house, forty-four feeing in the main dining fall. The claudiclein for the lights are unusually expensive, and present a beautiful appearance. On the second floor is the office and reading-to-one, also the hotel parties, all lighted with the Edison light.

THE EDISON LIGHT AT MILAN. La Perseveranza, a newspaper published at Milan, Italy, contains in its issue of February 12th, an account of the lighting up of the fover of la Scala with the Edison light. The report states that "The success could not have been more complete, and was all the greater because comparision could be made with the gas lights in the adjoining halls. Three chandeliers containing ninety-two Edison lamps were lighted. All acknowledge with admiration the beauty of the light and the wonderful simplicity of the Edison System. It was indeed a success." Another Milan paper, La Lomberdia in its issue of February 21st, states that "The experiment of the Edison light made in la Scala has demonstrated that the problem of electric lighting is solved, and that nothing remains to be done but to apply it on a large scale". Another Milau muer. Il Secolo, contains an article on the Edison light, from which the following extract is made: "Motors, electric generators, systems of distribution for streets and houses, regulating and moderating devices, apparatus for measuring the quantity of electric

ity consumed, safety appliances, all were lineaght forth from the mind of this extraordinary man, and all were wonderfully worked or out from a practical point of view, perfect us suspicity and dirability. The light emananter from the lamp, which is pershoot by the linearter of the language of a filament of variotative branches distingting an executated place globe, is when, and, limit for the language and, above all it does not have that glandly white color which remders, some other lights to disagreeable.

EDISON LIGHT IN RUSSIA. The following despatch has been received by the company, via Paris. "St. Petersbargh, Russia, February 23cl. First lighting by the Edison system in Russia began here to-medit and was a grand success."

THE WINONA MILL PLANT. Th: Winona Mill Company, Winona, Minn., in remitting a click to pay for their plant, write as follows: "We enclose draft to balance account, and we believe we have the best light known and do not bestate to say or."

180LATED PLANT IN OHIOAOO. An isolated plan has been statted stressedily in the wholesale dry goods sore of Messar. Markatal Field & Co., Chingo, The light gives with satisfaction that a duplicate plant has been ordered for the read store of the same fam. A plant has also been part in successful operation in the store of Messar, fam. A plant has also been part in successful operation in the store of Messar, fam. A NeXAII A Co., Chicago.

EXTRAOT FROM THE BOSTON TRANSCRIPT. The following is an extract from the Hoston Evening Trans. rpc, Mirch 3 pd. 1852.

"For the past ten mantle the Dilson hemsdowen lighting system as the position of the

ting the Pemberton and Arlington Mills; trip across to Lowell, and you will discover two hundred and sixty-two in the Merrianek Mills; back to Boston, and a call at the Boston Sugar Reilnery, will discle one hundred and twenty-eight. Proceed to New Redford, and you will find the same system in the Wamsutta Mills, and so on through Gleuville and New Haven, Conn., until you reach New York. Here we will and the Edison incondescent lights in use in such places as the Amerlean Bank Note building, Manhattan Elevated Railway shops, H. K. & P. B. Thurber's, wholesale grocers, etc. On our way to Philadelphia, if we should drop off at Beatty's large organ factory, at Washington, N. J., we would find the buildings illuminated with Edison's lights, and the same discovery would be made at the Clark Thread Works and the becometive works at Paterson. Reselding the City of Brotherly Love. should we call at the Rudwin Locomotive Works and John Steison's but factory, we would find them there, and so on throughout the entire West and Northwest, notably in the United States Rolling Stock

Company's works at Chicago, Ill., and Urbana, Ohio, and Winona Mill Company's mill at Winona, Minn., the third largest flour mill in the

country. Visiting Paris, upon homiry we will learn to our astonish-

ment that, at the recent electrical exhibition held in that city, Edison's

incande-sear light ligared so prominently that it won for its inventor the diploma of honor over all other systems of electric lighting. Home-

ward bound via London. If we should harmen to pass through Strasburg.

we would then the railway states in that rifty Blacker lighted by Black hungs. Blacker lighted by Black hungs are founded by the property of t

reach a very low price indeed to compute with this systems."
"The bellows illuminating Company, the level corporation which
has for its object the illimination of New York sity, in charge security
has been been assumed to be a support of the contract of

for supplying, the communes, over one thousand having arrowing, one tracted for those of the infigit. From this station the confinences run through the streets, being conveyed in tion place throughly insulation. In front over the contract of the contract

"Both the electric tabling and the electric meter have been theroughly tested, the former having been in use, covering a number of nulles, at Menlo Park, N. J., and have been found to be perfect in all their details."

"That some or later all the desire lighting companies will of necessity adopt some option of underground conductors admits of arive an exceeding the time for Jr. Elliender or the only one to are discussion; but thou for Jr. Elliender or the only one to are at a settle-factory solution of the problem, and its order is centre system such safety, economy and superbrity as all took bin to compete successfully with the gase containies, occurrently.

ELECTRIO LIGITA IN MANTORD. The City Government of Harnfoot is considering the quastion of requiring all electric light companes to place their conditions under the ground. A hearing note place before the Barnf of Street Commissioners and a joint special commuter of the Barnf of Common Commil, Mantor Jul. The Harlford Courant, March 5th, gives the following account of what note place:

"The onlight of the best annuar of couloming electricity was the world shape of fire, was discovered, show whicher devotricity could be could not be sufficient to the state of the state of the state of the above of the state of principle spice, as to what restrictions -similar to above on the state of the state of the state of the state of the Eldons Electric Light Company furniority had six nilled on most Eldons Electric Light Company furniority had six nilled on most families uphase; that all through one whiter they one the correct trough the above and the state of the state of the state of the state of the street made, highligh about seven marked house, distributed over the street made, highligh about seven marked house, distributed over the street made, highligh about seven marked house, distributed over the street made and the state of the state of the street made and that the system of made ground eight in take to a street of the state of the street made and the street of the state of the street of the analysis of the street of th and a second second

It was also stated that the Editions company is now capitaphys, a district of a mile argume in Now Yark city, there the observite correct still all to sent through subcreasons unities high in the street, from a shear of the sent through a subcreason with the sent through a subcreason of the sent through the state of the sent through through the sent through t

ELECTRIO LIGHT AND ACOUSTION. It is said that a marked improvement has been instinct in the acoustic property of theories where the electric light is used. A layer of leasted press at a v screen for sound, hence the witness of host fitness arising from the old gas forelights obstructed and narred, in some extent, the views of the singers. Whit the electric light, inclosed in air singlet builts, no funes can be emitted, and very lintle heart is given of. Hence it benefits the ears well as he eye.

EDISON LIGHT IN THE NEW YORK HERALD. We have wried the Herald Building for 72 Image. The dynamos will be placed in the Bounci Building, content of Nascou and Building Streets, and the current there generated will be taken up Ann Street in the Edition underground conductors, to the Herald Building. Mr. Benjiett is expected back from Europe in a few weeks and the building will not be lighted up multi after be returns.

THE EDISON LIGHT IN FALL RIVER. The following extract is from the Fall River Daily San of Match 16th.

'Thiring a desire to see the place and machine where the Edbon electric light was being produced, the writer accepted an lavitation from the nameges of the light in this place a low avoidings slice, and proceeded to the Pocasset Mills. In the wastern basement is station

ed a little engine of 17 horse power engaged in making faster time than was over accredited to Ordesudth Maid, for the purpose of turning a small cylinder at a terriide rate of speed. We do not know the scientific terms but believe this exlinder is the armature. Just above the grounture are seen four black looking pillars, perspective inches through and five feet long, connected at the top and resting on large blocks of iron. These constitute immense magnets, the blocks of iron being the magnetized poles. When these poles are not fully magnetized the armatures can be readily turned with the hand, but when everything is in operation it takes all the power of this little engine, made by Armington and Sines, of Providence, to overcome this resistance, What is this resistance? one asks. Just for an illustration, suppose you take your kulfe, over the blade and hold it near those blocks of iron. You will feel the drawing power of that magnet. Don't get too mar with your watch or its springs may become unquetized. Now this is the "resistance" to that engine. The electricity is generated and is driven out through the wires that you see in the street, as water is driven through a pipe; perhaps this explanation will give the unselentific reader an idea as to how the electricity flows along the wires. Along the water pipe in the streets are little pipes leading to the houses. So along the wires the electricity is tapped and out points a stream of light. This may be a bessely way of expressing it, but it gives the reader a rough bles of the working of the lights. At present there are 127 lights being driven by this engine, each light of 20 candle power. Last Saturday alght they were kept burning 7 hours without a hitch excepting the lights were turned off once. As the amount of electricity required for a large number of burners is larger than for a small number, there is no arrangement called a "Vestatuted box" where the wholn power can be regulated. No doubt on Tuesday night some persons say the lights go out for an instant and they wondered what the matter was. It was nothing more than that the dhil hand of the "resistance box" was turned round. just to show the writer how it could be done and out went the "electric." This is economical for the company who makes the light, as only the amou required need be furnished; all that needs to be done is to adjust the "resistance tex." Many here read of the danger lurking in the subtle electric fluid, and have been informed that electric nuclaines endanger people's lives. We were invited to try how gentle the electrie shock was, and we will admit that it took some fulth to make the experiment. It flashed through our nahels, "what if something is wrong and we should be struck down as by lightning." But being assured there was no danger we proved it by taking hold of the wire; intelly a shock was perceptible, so overly was it distributed to all the lights. Then to guard against fire there are anote precentions. It

may be blought by some that an extra amount of electricity can be low up to a spottine of the wire and a limin. But this is pureful against by a fittle load wire which is melted when the heat it to extra another consent and the consentations are included before my intare on the done. There is absolutely no change from the Edbour spotem. The little melter of the spote of the spot

PRIORESS IN NEW YORK CITY. A precise statement of the progress made in brigin the underground combinetors in the first central station in New York City, may be of intenest. The total brength of medeground considerators for the crutic district is 2,3,33 feet. Of this amount, 39,403 feet wore hid prior to March vot. 1854, Inerting 33,940 feet yet to be laid. The flood now being out of the promote, the work is progressing in good weather at the rate of absort one thousand feet a day. The medigenound conductors used by the company are an invention of Mr. Edison, for which a process (Xo. 251,552) has been found.

EDISON LIGHT IN THE CRYSTAL PALACE, LONDON.

The following extracts are from the Lambon Globe of Federate yields with some five the Carlo Ballo of Section (All Robert Section to assume something of the attractiveness which the pathle have been to assume something of the attractiveness which the pathle have been much to account the All Robert Section (All Roberts (All Robert Section (All Roberts (All Roberts)))).

lighted by electric lamps, and the great merit it is intended to present, we suppose, consists to the illumination having all the best characteristics of gas lighting, and absolutely none of its defects. There are festoons of small lamps, perhaps 150 of these round the galleries, there is a circular of them in a crystal pendant hanging from the roof, and there are a few lights dispersed under the galleries. Altogether the effect is that of gaslight, only more brilliant. There is none of the ghastly whiteness that used to be felt a fault, but just a soft, brilliant yellow light, and to show the possibility of diminishing the light to any point, Mr. Edison's name is exhibited over the organ in small lamps, appearing, as seen from the body of the hull, to be presented on a loard of about a yard long and a foot wide. The entertalmment ball, on the other side of the Palace, however, is the crowing triumph of this inventor's system. There is an enormous gift pendant in the centre of the room, lighted up by about a bundred lamps, and about the room are products, brackets, table-hamps, Ar., In all sorts of forms, some of them arranged to permit of visitors testing for themselves the facility with which the light may be turned on and off, a top, just as in the case of gas, afferding the means both of extinguishing and relighting. There is at one end of the room a large billliard-table, beautifully lighted up, and at the other a ministure theatre stage. This entertainement ball is really a magnificent display of a system of lighting beyond which it is impossible to conceive of up improvement, and assuming that it can be carried on at a cost approximating to that of gas, its universal adoption must be held to be an absolute certainty, and that in a very short time."

The London Daily News of February 27th, contains a long account of a visit of the Duke and Duchess of Edinburgh, to the Electrical Exhibition at the Crystal Pakee, London, February 23th. The following extracts refer to the Edison light.

"Dessigs sentiments pass the great stage, they entered the Court Brown, where was seen are, his by a remark the principal, display of the Dillson electric lighting system. The remarkedly entering manages can the being derivingly large in fostors in the contraction of the contrac

"The Edison display in the Entertainment Court was in point of taste, perfect, and as an illustration of the domestic uses of electricity complete. The central attraction of this tastefully arranged display is an enormous glit chandeller of clabstrate floral design, but which Mesers. Verity and Son have evidently put their best work as art metal-workers. Conspicuous in the metal work is the reputition of that blussom of asthetle age, the sun-flower, yet it does not obtrude itself as its posturing admirers are reputed to da, but rather contents itself with the position of a modest foil to other flowers, which, being severally endowed with a corolla of tinted glass, have the distinction of radiating the light. At the will of the lighter 120 variously-horsi llowers blossom on this gabien tree, growing downward from the celling. You open a little secret door in the panelling of your wall and there observer a handle roady to be turned. Serew it one-third of a turn to the right and you have a third of your lights turned on; one more touch and a third more of your flowers are blooming and imparting fresh light; complete the turn of the handle and the full brillioner of your chandeller is displayed. Tids is the application of the Edwar light to the assembly-room. In other parts of the room next bumps, neatly arranged, exemplify the use of the light in pariour or History, and particularly its admirable illumination of the billiant table. The devices for the bounder are particularly striking. For example, in the interior of wall mirrors with lavelled glass frames is placed on becomescent lump, and light is thus thrown on to the surface of the micror from the bevelled sides in a manner which should occasion the despuir of manufacturers of mirror emideluters. There is in this device also the suggestion of a mode of Hinnihaling works of art. An extremely next electrical eight or pipe lighting apparatus much massed the Dake of Ediaburgh and his friends. In front of a small percelain column are arranged vessels centabling pipe lighters of metal immersed in a laibnumable liquid. On the withdrawal of any of these from its piace an electric current which was hitherto prese nisty found a short got to its destination through the end of the pipes lighter has to follow a new route which leads it through the interior of the percelain column and out to a glates on the top, where it meets with a small spiral of wire. By the time the smoker has get the phys-lighter fairly out of its maket this little spiral is approaching white heat, and your hove but to apply the seaked pipe-lighter to obtain the needed light. Replace your lighter in its steket, and the light almost instantaneously disappears. This simple but ingenious application of the electric current to the wants of the smaker, may be commended to the earnest attention of the Anti-Tabacco Society, for

who knows whether sumskers may not be identified in adaption that their contributions to every lamppose through which the normal power, as a human is now, as a financies in injectiveness on the analysis of you have patient instead of normalization placescalists. The innerse of the political system of normalization of normalization and produced by the contribution of normalization of the political system of the political system of the political system of the political political values of the political system of the political political values of the main by which mader this value of the political values of the political valu

The London Daily Chronide, also of February 27th, gives the following account.

"Certainly to Mr. Edison must be accorded the merit of making a magnificent display of the latest things in electric lighting. Not content with illuminating the convert room by means of his incomdescent lamps, he has taken possession, for miscellaneous exhibits, of the Emertalnment Court, and here the Royal party spent a considerable time in inspecting what was to be seen. Apparently the object of Mr. Edison is to indicate that the electric light may be put to all uses to which gas or candle has hitherto been turned. He has the model of the processium of a theatre litted up with a row of electric foutlights; a billiard table with electric lamps over h; a reading table with a shaded electric lamp for the student, and an electric pen; an electrio-lamped chandellur for a room; an electric hall hoop; a brocket, like the ordinary gas lixture, fixed to the wall, with on electric lump attached, which may be lit and extinguished at pleasure by turning a button; and mirrors for dressing rooms with electric lamps pendent at each side. The chamber is of resplendent brilliancy with all these lights burning, sided by a massive, glit chandeller, studded with ciectrie lamps in the centre. By the easy mode of turning off and ou, the different lights there is simply demonstrated the sublivision of the electric light and its adaptability for house-habi requirements".

The following extract is from an article in the London Metropolitan on the subject of the Crystal Pulace Exposition. The chief latours of Mr. Edbon in electrical lighting love been electric in improduction of a system for general and for domestic electric in the production of a system for general materials and particles. To this one, the array of the production of the light, and in all ide effort, but explainly to this system, and has striven to generate the perfectled system required for its specific in the mast economic ways.

"For ourselves we have no hesitation in saying that, for indeer purposes, so have more seen a light more efficient as a means of linmination, or more pleasant to these assembled under its inlinences,"

The following is an extract from the Journal of Gas Lighting, London, February 21st 1882, regarding the Edison Light in the present electrical exhibition at the Crystal Pulace.

"The admiration of the public is reserved for the incandescent lamps, wideh are present in great numbers, and make a most effective The small payllion designed to exhibit the qualities of the Swan lamps is not yet roady, but all the other known forms of this class of lamp are in full evidence. The pulta is unquestionable carried off by the Edison show, which is extremely beautiful. It is divided into two parts, that in the Concert Room demonstrating the capabilities of the lamps for places of public assembly, and the other portion, in the Entertainment Hall, being more particularly devoted to examples of domestic lighting - in the former, a crystal pendant, thickly sprinkled over with the well-known egg-shaped bulbs containing bondoms threads, langs in the centre of the hall, and festoons of lamps are strong from pillar to pillar round the walls. The light is everything that can be desired. In the other section is a magnifibent pendant of arought and polished trass, of great size, also tidekly sprinkled with luminous builts, which are artistically adapted to the design of the pendant. As a spectacle this single piece of workmanship is perfectly dazzling, and excites the warm admiration of all behablers. The room also contains a biliard-table lighted by the same agency, a smaller pendant, various forms of standards, a row of bulbs showing how they can be applied as stage footlights, and a handsome hall perdant over the door. All these multitudinous lamps are maintained in full power, and give a most brilliant effect."

The same paper in its issue of February 28th, makes the follow, ing reference to the Crystal Palace exhibition:

"Without seeking to point a moral to the inspection which takes place at the Crystal Palace to-day, and in respect of which there may

possibly be some divergent opinions formed by the members of the Gos Institute and their friends, there is one very prominent feature of the show which can senredy be overlooked. We do not speak so much in regard to the are lamps, although the sums remark applies to this class, as of the various descriptions of heandescent lamps, when we say that gas engineers may take a lesson from the treatment of their langes by the electrical engineers. These langes attract a great deal of attention, and excite much admiration from the general public, for two reasons. In the first place, the quality of the light is excellent, and its stendiness equally remarkable; and, secondly, the appliances whereby it is shown to be adapted to various uses are strikingly beautiful and appropriate to their purpose. The early development of gas lighting. like that of railway travelling, took place at a time when artistic and rational methods of treating new appliances intended to suppliant old things were unheard of. Gas fittings were made to inditate candles and oil lange, and have continued to do so down to the present day. Class engineers did not, even if they could, instruct gas-fittings manufacturers in the principles by which the lest effect could be produced from the gas burnt; and the manufacturers and brassworkers of the time were immentably delicient by the power of originating true and artistic designs. Thus, partly from the carelessness of individuals and partly from the spirit of the age, gas-dittings became the inefficient and meaningless things which, but for some nysiern efforts at reform, they would still hopelessly remain. Incumiescent electric lighting has dawned upon a widely different period. The progress of art is evolutional even to makiness in some respects; but under all this modern extravagance there is a sense of the messelfy of bringing out the stress of things, to widely the handleraftsmen of the past generation were strangers. Hence it is that the incamiescent lamp fittings at the Crystal Palacoure so effective. Electricians and brassworkers have combined their energies for securing a common object, and the result is equally original and appropriate. We shall not find Mr. Edison attempting to make his luminous thronds imitate candles, lamps, or gas-burners; they are treated as they deserve, on their own merits, and they amply repay for the consideration. Therefore this exhibition at least shows that the details of standards and pendants are not held to be length the observant care of the engineers who prodi, he light. Gas engineers must take a similar educated interest in all that apportains to gas lighting, in order that the special economical advantages of this system, on which they are niways so ready to dilate, shall not be missed through the ignorance and carelessness of gas litters and consumers.

The above extracts coming as they do from perphaps the leading Gas Journal of the world, are especially interesting as showing the change of tone in which such journals now speak of the incandescent electric light. The tone is no longer flippant and skeptical but full of thoughtfulness and alarm.

SIXTH BULLETIN.

The Edison Electric Light Company, 65 FIFTH AVENUE

(These bulletins, originally issued as a convenient way of answering the inquiries (a nove to not many continuity source as a consequent way or abovering one impurites of distant agents, are nom, in response to numerous requests, which also to all stocks holders, to give them information of the progress of the Company and of other matters of greater or less interest connected with electric lighting. Agents are particularly requested to communicate to the Vice President schaleser practical points of general interest may be developed by their experience in notalling or operating our lights.)

New York, March 27th, 1882. THE EDISON SYSTEM. Mr. Edison is the only inventor in electric lighting, who has a complete Stotom. In the case of other inventors, one claims to have a lamp, another a dynamo, another a regulator, and still another all three of these things. But Mr. Edison has gone further, and has perfected not only a dynamo, a regulator and a lamp, but also meters, motors, conductors, underground mains, junction boxes, sockets, chandeliers, brackets, and a large number of other devices, altogether constituting a complete and perfect System of electric lighting. This comprehensiveness and perfection of detail is peculiar to Mr. Edison, and it is this which secured such matchless praise for him from scientists at Paris during the last summer, when high European authorities, like Preece and Dn Moncel, who had previously entertained doubts regarding his success, expressed themselves as being converts to "the perfection and completion of the Edison System."

PROFESSOR PREECE ON THE EDISON LIGHT. Professor W. H. Preece, F. R. S. London, has made a special report on the

progress of the electric light in England. He says:
"Most of the experiment that have been tried and the installation that have brillerte leven made, have been me connection with Archamp, but the counts of the superfuncts and the bessyns hermed in bards show monistrickedly that the Arc Lamp is only suitable for archam large season; and that for internal purposes, for siftee word and homehold purpose and the first property of the suitable season in the sui

suppliant gas...
"There are four systems of furundescent Light now on trial. The Swan; the Lame Pox; the Maxim; and the Edison. I have examined them all with very great care, and I have come to the round-hole in his by far the lost in all its details is that of Mr. Edison—in fact bis system leaves fitting to be described.

"A magnificant display of the Ellina system has been made at the Cystal Plakes. The Gonnett Bons has been Hillmahrist every shirk for the past formholds and has not with southless but the highrest plants and the past of the past of the past of the past Challett, and very some the veloce of the Vallent and every shop and hoose upon it will be illustrated. The Post 10th onther three arplaces are part of the past of the past of the past of the experiment of distributing the Electric Light on a great of such a loant to be thoroughly parted. I have no death of the success, and for all the past of the past of the past of the past of the formation of the past of the past of the past of the past of the formation of the past of the past of the past of the past of the formation of the past of

AIR WILLIAM THOMOSO ON HIGH PRESSURE LIGHTS, SI William THOMOSA SHORES SO PENSIGH of the Physical Section of the British Association, contains the following passage: "Nothing above two hundred volts englist on any account ever to be admitted into a house or ship, or other place where safeguards against accident cannot be made absolutely and forcer trustworthy against all possibility of accident." This opinion accords with what Nr. Edison also always and, that in the long run every electric light system will fail which does not use a low-pressure current; and it explains why he worked from the start to prefect such a system. His quickest and

easiest way was to do what others did, namely, adopt a high-pressure. regardless of the danger of life and of fire involved in it. Mr. Edison, however, did in this respect what he has done as regards all the other peculiarities of his System-he absolutely perfected it, so as to make it safe and economical, before endeavoring to introduce it into public use. Consequently, we use a low-pressure current of only about 100 volts, while all other lights require a high pressure, even as high sometimes as 2,100 volts. This enormous difference means absolute safety in the one case, and actual death in the other, if the wires are touched. Accidents from high pressure currents continually occur. For instance, last week a man in Denver, when about to connect the circuit-wires of a certain are light, was completely paralyzed; and recently an employee of the Cleveland Rolling Mill Co., was instantly killed by coming in contact with the wires of the same are light company. Mr. Edison's foresight and thoroughness save us from such terrible experiences. Our light is now burning all over the world, from Finland to Chiliusually in the hands of muskilled men, atterly ignorant of electrical matters-vet we have never had a fire or an accident.

EDISON LIGHT IN CHILL. The principal hold and surrounding grounds, at time Del Mar, seven units from Valparison, has been lighted since January 20th, with an Edison isolated plant. This tuwn is located on the coast, and besides being a place of popular research for wealthy Chilana, is also the residence of many of the leading business men of Valparaiso. Prior to the introduction of this plant, the lighting had been done by mensor of gas and Kerosene. The plant is giving perfect satisfaction both indoors and out. The illumination in the grounds and gardens about the louds, where the Edison light is exclusively used, is unusually beautiful and satisfactors.

METERS FOR THE FIRST NEW YORK STATION. The Edison Rectific Meter, for answaring the current of electricity sould to consumers, the same as gas in sensoral by the thousand feet, is working successfully. A large number are more bring made for the Part Street Station. Twenty to affit meters and fee 50 glides meters have recently been shipped to London to be used in connection with the small central station plant incalled on the Holloon Yaduct. The meters are entirely reliable, in fact they may be said to be absolutely accurate, being vastly superior in accuracy to the best existing gas meters.

RALLWAY STATION LIGHTED AT RIO. The Don Pedro railway station at Riod Jamein, Back, incom lighted with a Edison isolated plant. The lamps are distributed to light the platform, writing room, Director's room and the entrance. The Directors and ethers connected with the railway company new well placed. A commission has been appointed by the Engineer's Chio of Rio to report upon the light. We have received a copy of the principal made at the railway station under the supermetendone of the Chief of the Kullway Telescept Department, and expressing complete satisfaction with it. The Minister of Public Works was expected to make at with offineerich the supermetending week.

EDISON LIGHT IN FINLAND. The following cablegram relative to the Edison isolated plants just started in the factories at Tammerfors, Finland, was received March 17th: "Light installed in latitude 61. Perfect success."

DANGER FROM GAB. The gas house of the Wilkes-Barre Gas Company was demolished by a gas explosion, March 6th. The

Wilkes-Barre Record states that "some of the timbers flew high to the air and fell on all sides, the canal was nearly filled with slate and woodwork, doors and windows in houses near by were broken, a passing huggy had a wheel taken off, a man passing by was thrown to the ground and stinned, five workinen were prostrated, and had any employees been in the part torn down, they would certainly have been killed." The explosion left the city entirely without gas, pending repairs. * * * A recent gas explosion in the Union Building, Chicago, knocked out heavy plate glass from windows in all parts of the building, and wood-work, doors and plastering were demolished. A box, James Brett, was seriously if not fatally injured. * * * R 11 Stryker was recently found dead in his room at the Hridge Hotel, Chatham Street, New York, killed by the escape of gas, which he had blown out instead of turning off, * * * Another man, F. W. Hoffman, was lately found dead in his bed at the North River Hotel, in Barclay Street, with the gas turned on. ** * A distinguished American authority on nervous diseases, in an article entitled, "How to Escape Nervousness," in a recent number of Our Continent, speaks of gas as follows:

"A gashermer roussuing four cube feet of age toy four, proloce more creation and has agiven into their selective from temphration of eight solid human beings. Beer this it minds, you will make from increasions, that she my have had yourselves up in jour rooms and lighted an argued learner tribled consumes about view cube for of Gas per learner, you are roul intention upon improve innumer with the eight probability of the proposed in the grage from the analysis. It is the wonter that after were those expenses to such dampelors. It is it wonter that after were those expenses to such dampelors. It is it wonter that after were those expenses in the such as the table, and that your head simulated, your lands terrified, not that, your daughter a large on the plant submott of three you will be

EDISON'S PATENTS. Ninety-three patents for electric lighting have already been allowed Mr. Edison in the the United States. Of this number eighty-one have been already taken out and assigned by him to this Company. Besides these, he has filed applications for one hundred and one additional patents, which are being regularly acted upon in due course of proceeding at the Patent Office. These patents cover the following deaths of the Edison System, viz: Dynamos, the preparation and manufacture of carbons and their treatment after manufacture, carbonizers, underground conductors, safety wires for conductors, motors and appliances therefor, sub-division, vacuum apparatus, webernsters, sonage of electricity, hamps including earhons, designs for hamps, designs for fittings and factures, manufacture of hamps, the sealing of hamps, themb screes for turning the current on and off, sockets, and devices against fice and personal changer.

The following is a list of the first \$1 patents for electric lighting, issued to Mr. Edison in the United States, with the number, date and title of each.

STREET.	1	PATE.		TITLE OF PATENT.		
214,636	April	22,	1870	Improvement in Electric Lights.		
214,637	. "	22,	••	" Thermal Regulators.		
218,166	August	5,		" Magneto-electric Machines.		
215,167	**	5,		" Americant at the Machines.		
218,566		26,	••	"Apparatus for Electric Light		
219,323	Sept.	9.		"Electric Lighting Apparatus		
219,628		16.		"Dynamo-electric Machines.		
222,881	Dec.	21.		Liectric Lights.		
223,898	Jan.		1880	Jugueto-cloctric Machines		
224,329		10.		Electric Lamp.		
227,226				Electric Lighting Apparatus.		
227, 227	Mar	4.		Safety-conductor for Electric Lights.		
227,228	Jiny		1880	Elcetric Light.		
		4,	**			
227,229		4,	**			
228,617	June	8,	**	Brake for Electro-magnetic Motors		
230,255	July	20.		Mothod of Manufacturing Plants		

7						
MARKE	. Date.			TITLE OF PATENT.		
237,73	i Feb.	15.	1881	Ricetric Light.		
238, 568	Marc	th 15,		Manufacture of Carlsons, Incandescent Lamps		
239,147		22,		System of Electric Lighting.		
239, 148		22,		Treating Carlsons for Electric Lamps.		
239,149		22,		Incandescing Ricetric Lamp.		
239,150		22.		Electric Lamp.		
239,151		22.		Mothesi of Ferming Enlarged Ends on Carlson Fliaments.		
239, 152		22,	.,	System of Electric Lighting.		
239,153		22,		Electric Lamp.		
239,372		29,		Testing Electric Light Carbons.		
239,373		29,	., '	Electric Lamp.		
239,374	* **	29,		Regulating the Generation of Electric Currents.		
239,745	April	5.		Electric Lamp.		
240,678		26,		Webermeter.		
242,89G	June	11,		Incandescent Ricetric Lamp.		
242,897		11,				
242,898		14,		Magueto or Dynamo-electric Machine.		
242,890	**	14.	h	Electric Lighting.		
212,900		14.		danufacturing Carlsons for Electric Lamps.		
212,501		14,		Sectric Meter.		
218,416	Ort.	18,		faunfacture of Carlons for Electric Lamps.		
248,417		18,	. 3	Innufactoring		
248,418	**	18,	. 1	Sectric Lamp.		
248,419		18,	'F	Sectric Lamp.		
215,120		18,		exture and Attachment for Electric Lamp.		
218,421		18,		arrout Regulator for Dynamo-electric Machi- nes.		
148,422	**	18,	. 8	estera of Electric Lighting.		
148,423		18,		arboulzer,		
18,424		18,		Itting and Fixture for Electric Lamps.		
48,425	**	18.		pparatus for Producing High Vacuums.		
48,426	••	18,		paratus for Treating Carbons.		

" .Apparatus for Tresting Carlsons.

SEVENTH BULLETIN.

The Edison Electric Light Company

95 FIFTH AVENUE.

(These bulletins, originally issued as a convenies: way of answering the inquiries of distant agents, are now, in response to mancrone requests, sent also to all stock. bolders, to give them information of the progress of the Conquiny and of other matters of greater or less interest connected with electric lighting. Agents are particularly requested to communicate to the Vice President whatever practical points of general interest may be developed by their experience in installing or operating our lights.)

New York, April 17th, 1882. THE FIRST DISTRICT IN NEW YORK CITY. The installation of the First District in this city is almost completed. The district is nearly a square mile in extent, being bounded on the East by the East River, on the South by Wall St., on the West by Nassan St., and on the North by Sprace St., Perry St., and Peck Slip. The buildings purchased by the Company to be used as a central station to generate the electric current to be distributed over the district by means of underground cables, are located at at Nos. 255 and 257 Pearl St., a little South of Fulton St. For the present only one of these buildings, the one at No. 257 Pearl St is being fully equipped. The preparation of this district for lighting has involved a vast amount of work, which, generally speaking, may be divided into four branches, namely, the structure or the preparation of the building for the reception and maintenance of the plant, the mannfacture and installation of the engines, dynamos and other electrical

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apparatus, the manufacture and laying of the underground conductors, and the wiring of houses. The work on the first of these items, to wit, the central station structure, includes the masonry foundation and concrete, a two story iron frame work, vaults under the side walk and streets, four boilers with an aggregate caracity of ",655 horse power, boiler fittings, two smoke stacks (each 5 feet in diameter and 85 feet high), steam conveyers for coal and ashes, shafting, blowers, and the pumping and blowing apparatus. The above work is all finished. and the hoists and ventilating apparatus, also belonging to the central station structure, alone remain to put in. The station equipment consists of six engines, six dynamos, and the resistance and regulators. The engines have been built by the Southwark Foundry and Machine Company, Philadelphia, and delivered to us. There are six of them, each having a normal capacity of 125 horse power, and a maximum capacity of 200 horse power, making a total maximum capacity of 1,200 horse power. The six dynamos, being built at the Edison Machine Works, Goerek St., New York City, are approaching completion. The resistance and regulator apparatus is also nearly completed. The weight of each of these six steam dynamos is thirty tons, making the aggregate weight of the six dynamos, 180 tons, The weight of the entire structure and electrical apparatus, at No. 257 Pearl St. alone, will be about 500,000 lbs., that is to say about 250 short tons, and this weight will be distributed so as to average only about 200 pounds per square foot of structure. The boilers in this one brilding, when under full headway, will consume 1,650 tons of coal and 4,200,000 gallons of water per annum, equivalent to a daily consumption of about five tous of coal and 11,500 gallons of water. As regards the underground conductors, work is being pushed as rapidly as possible. Prior to March 1st, 1382, 39,403 feet of the underground mains had been laid. In the month of March, 15,898 feet more were laid. In that month there were 27 working

days and 4 Sundays, but, owing to the loss of 5 days from rain and 2 from other causes, we worked only 20 days and one night, the average feet laid per day during the month being 588, the average for the days which we actually worked being 795, the least amount laid in any one day being 423, and the largest amount laid in any one tlay being 1,246 feet. There yet remains to be laid something over 18,000 feet of the mains, besides bridges and connections at street intersections, which, it should be stated, will take a much louger time. per foot, than the regular mains. Regarding the wiring of houses, they were finished early in February. We have completely wired 107 places in Beckman St., 166 in Fulton St., 75 in John St., 78 in Maiden Lane, 97 in William St., 46 in Front St., 68 in Nassau St., 43 in Pearl St., 36 in Cedar St., 28 in Pine St., 24 in South St., 31 in Ann St., 12 in Sprace St. and enough more in other streets to make a total of 946 places wired. The number of lamps arranged for in the places thus wired is 7, 916 A (16 candle) lamps, and 6, 395 B (8 candle) lamps, making a total of 14, 311 lamps. The lamps themselves were made mouths ago and are now in store ready for use. The central station will supply electric current not only to illumine these and additional lamps, but also to run motors for elevators, hoistways, printing presses, and machinery of all kinds. From all that is stated above. it will be seen that little now remains to be done, except to finish the laying of the underground conductors, before the First District will be entirely completed, and the lighting-up commenced.

UNDERGROUND CONDUCTORS IN HARTFORD. The Hartford Time of March 15th, contains a report of a Joint Committee of the Beard of Aldermen and the Street Commissioners, made to the Board of Aldermen, on the subject of Underground Electric Conductors. The following extract contains the substance of their re-

«Your committee are extremely averse to the erection of poles and posts in the streets, especially for the purpose of suspending electric wires, if it can be avoided without too great expense. In regard to this, the petitioners claim that no plan has yet been devised for correying electricity under ground, excepting at a great expense of power. The explanation which your committee have been able to obtain is not in harmony with this claim. The Edison company are now covering a district in New York city, one mile square, with their electric conductors laid in iron tubes under ground, and claim from experiments on miles of these tubes, to have demonstrated that there is no material loss of electric force, even in comparison with the wires above ground. Now, if the claim of the Edison company that electricity can be conducted in these small tuber at an expense not materially greater (except in the original outlay) than on wires in the open air, then the posts and poles ought not to be set up in our streets; nor the very considerable danger arising from the wires nuneversually incurred. The fact of the matter will be very soon determined in New York -another reason against undine haste. If, on the whole, it should appear best to permit the experiment in any form, we think the council or the Issael of street commissioners should retain full control of every detail of the arrangements, and that everything done should be subject to approval and resocation. All crude experiments should be avoided, and the best system should be adopted, even if it be not the cheapest in the original construction."

The report was accepted by the Common Conneil, March 13th, and the use of the streets for poles, was refused.

CANADIAN COMPANY. The House of Common Dibate, Octawa, March 20th, contains the debate on the bill incorporating the Edison Electric Light Company of Canada. At the close of the debate the bill incorporating the Company was passed by the Lower House. It now goes before the Upper House.

PLANTS IN CHICAGO. We are installing an isolated plant in the blumer Hume, to light the illumpersons *** The plant in the store of Rand, McSally & Co., gives great sublication. They say that if they should take the plant out and noe gas again, their near would limited upon lavving our light put lack. They find the light of great use in mixing colored ticks, which cannot be successfully done by goalight. ** Nr. John V. Farveil, has ordered two lookated plants for the Republic Insurance Buddings. MINIATURE GENERAL STATION AT FALL RIVER. One ofor small plans, non enabled in Fall River, is highing sensitions of a clair, the same being located in two different blocks. The place helited are as follows, namely, limited by early some case of the carted in two different blocks. The place helited are as follows, namely, limited by early some charles of the carted in Bock). Bomes indicting establishment, Trafton and Anthony's hardware store, i. D. Williar and Co's rowly made clothing establishment, the Western Union Telegraph Office, row entrances to the Academy of Music, and the corribor and the Commercial Clair towns in Burden Bock, and the corribor and the Commercial Clair towns in Burden Bock, and the corribor and the International Commercial Clair towns in Burden Bock, and the corribor and back four hundred feet way from the Bangs. Regarding this plans, Mr. Spieners.

"Last night we completed the first 130 hours of mining our small station in Fall River. Everyone noing the light is high in its praise, as a superior light to gas. Mr. Boom says he gets three times the light he did with our, and that it is entirely free from any of the disadvantages gas his. Most of these stores remain open until to P. M. L. D. Wilber and Co., who had thirty gas lights (replaced by twenty-seven of ours), tell me that betwee the hour of closing, their gas need to make their store suffocating, both because of the heat and the had air. They say they do not see how they stood gas so long, and that they never will let our electric light leave them if they can help it. The testimony of the others is uniformly the same. The Manager of the Western Union is especially loud in praise of the Edison Light; and Bruneau says so much mits favor that he has been asked, as a joke, what he was poid for advertising it. In the Club Rooms it is greatly admired, especially in the reading roomwho know the cost of running the station, need no assurance that the fight is economical--much less than one half the cost of gas to light the same spaces, and far less than any other method of good artificial lighting. We also have here had an opportunity to test the lite of the lamps. Calling the cucuit 120, instead of 127 lamps, the average of 600 hours for which you guarantee the lamp, would allow 30 to be broken in 150 hours, if not raised to an incambescence exceeding 16 candle power. Our lamps, however, are actually humed at a higher incamlescence than this was high as from 20 to 25 candle power. Yet we have broken only sevent lamps, two of which were in the same fixture, fastened to the same frame as the door in Sargent's store, and I strongly pect the slamming of the door had something to do with the breakage. Still, calling these worn out by the current, the average is very low. The apparatus is running to perfection, the dynamos being perfectly balanced, and entirely free

from paids at the communities. The engine has been delicated and show 1/2, howe power, shift diversabuty 2, hopeing the been power applied in the spinder. When it is considered that this includes the first power and power in the considered that this includes the first power in the control of the power in the power in the control of the power in the power into the power in the power into the power into

en de la Callint Stadente de la callina

PROOREM IN NUMBER. Two isolated plants are running at Frankfor, and one at linathung. Our light has also been shown on rulewy trains at Frankfort with great success, also at Sintinger. The dimmanation of a portion of the Strasburg depth is a great success, and inecontinuous are pending for lighting the entire station. At Man, the Scala Theater has been lighted up for nearly two mentles, do a street in the city, and now the "Colds Bink" is lighted with one of our plants. The Milan papers, the Londontia and the Pertannaies, both of March 250d, speak very latternople of the lighting up of the Colds. Incitalitations are about being made in Kome and Ferran-A large factory as veryta is just being lighted. Level computes, are in process of formation for most of the committee of Europe, the decisits of which will be given in future numbers of the Bulletin.

EDIBON'S ELECTRIO RAILWAY. April 7th, Prof. Geo. F. Birker, of Philadelphia, and Prof. Henry Draper, of New York City, visited Menio Park, with Mr. Elbon, to rise up-on the electric railway. The trip was very satisfactory. At present the raul is only equipped for passeper traffe, but a freight engine and freight cars are only the property of the pr

EDISON'S FIRE PROTECTOR. The Electrician, London, March 4th, contains large illustrations of Edison's Fusible Conductors, and describes them as follows:

"An inspectant part of Mr. Bleer's arrangement is that which provide scant for. It can be early understood how from some underwork areas convert sight be sent into a unit steager than the unit was a signed to carry. This string current would beat the wise and poolily to are servious michief. To goard against such mischane, Mr. Bleen inserts a mentale insulate contrelled relative to considerate, while these under a certain current. This fortered is a service of the consideration of the considerate in the consideration of the consideration of the consideration of all and the consideration of the consideration

STRAMBHIPS TO BE LIGHTED. We are swing at Cumply shipped piles for teambility better of the Brick, belong- as the text, belong- and to the Oregon Kailway and Navigamon Compuny. This codes in onesseparce of the success of our of pairs on the Columbia, an other steambily belonging to the same Compuny, and lighted with the Edilson light. " * We are also writing Mr. James Gordon Bennett's steam spekt now being built at Ward, Stamon and Ca's Superal, Newtonian.

UNDERGROUND CONDUCTORS IN PRIODE ISLAND. The Presidence Journal of Methol 15th, contains a reject of a continual hearing before the Senate pluticity Committee of Ribbel Island, on the question of compelling electric light companies to place all their conductors under ground in the sextee of Ribbel Island. The following extract, taken from a published report of the proceedings, recites interesting force.

"Hoth in Lowdon and in Yasis, electric light units are not allowed over head for more than temporary peopose. In In-hood he whoway no all the large steech average four feet in height, and the uner are there instead to the walls of these subsavays. Through the who way also run the gast and water maint. The sub-ways are dry, leding distinct from the drains; consegrently, the arbitratings of non-exposure of the electric where to wish and wearings of the sub-ways are sub-ways are sub-sub-ways and the subgently, the arbitratings of non-exposure of the electric where to wish and wearlently. der an obrinn. This is the same way in Paris. In both cities it is very difficult to get premission to just une contented. In Instant, all referepts and street when are under government content, and it is norty impossible to me vines conclusion. In Britis, when as when she report in Explose and citetic lights—have some to be put indergenousl, the two femore are mus on the copyrise side of the street to the large, and all cracedings are must easily the angles or dones angles to avoid links, title effects. Desirts, ware in Paris, on, and without mach burdle.

PHILADELPHIA LEDGER. We have received an order from the *Philadelphia Ledger* for one of our isolated plants to light the compositors room. It will be installed at once.

UNAUTHORIZED URS OF MR. EDIBON'S NAME. Octables ally an abseries, whosing to eath the public, eq., uses the name of Elbon, but does it in such a namer as not to transgress the strict test of the law. Thus the public are imposed upon and Mr. Elbon is powerless. One of the latest case of the knot is the Elbon is powerless. One of the latest case of the knot is the publication of a necesspay in Publicable plus called Elbon Mess. Compans. As settled of Mr. Elbon Mess and control the publication of a settle plus message deplayed on the first page, together with sevent references to his inventions, make the publication tooks at if it also super connections with imm. Mr. Elbon will take legal step to suppress this publication of possible. But ordinarily, the use of his trans ley advertues, is managed so admittly as to afford no adequate ground for legal proceedings.

PLANT AT BTILLWATER, MINN. Mr. Rone; foreman in clurge of that part of the works of Seymour, Sabin & O., Stillwater, wherein one of our isolated plants is installed, states in a recent letter that "the dynamos are running splendidly, day and night, and the same, and the same brushes are being used that were put on at the start, and

they seem as good as new." This plant consist of two Z dynamos musting 186 B (eight caudle) lamps, thirty of which are in the residence of Mr. Salán, one thousand feet distant from the works. The dynamos were started December 11th.

DANGER FROM GAS. The gas house of the Westchester Gas Company, Yonkers, exploded recently. The American Gas Light fournal says: "The building was a mass of mins, the front and north walls were entirely blown out, the other walls were in an unsafe condition, and the iron roof was twisted in all sorts of slapes." The cause of the explosion was owing to an escape of gas through a pipe in which there was a cock which was supposed to be shut. * * * Auother recent explosion at Youkers took place in the store of A, Salmigan, caused from the sewer in the street being filled with gas, emanating from leaky mains, and the gas finding its way from the sewer through the soil pipe. * * * Two young girls were recently found dead in their bed at 500 Third Assume, New York. There were two gas jets in the room and probably both jets had been turned on in the darkness and only one had been lighted. The escape of gas from the other jet caused the deaths. * * * Last October, fifteen employees in a room in the silk factory of Copeant & Co., Youkers, were prostrated by the escape of gas. One employee, Mrs. Kilgour, remained for some time in a critical condition; one went into convulsions; another, Miss Birch, was taken home insensible and for some time doubts were entertained of her recovery; while the others were similarily though not so seriously affected. * * * Wells Brainard. of Gainsville, recently died from asphyxia, the result of blowing out the gas upon retiring, at the Clinton Hotel, Rochester. * * * The records of the New York Coroner's office show that gas suffocation has caused eleven deaths in New York City within the last two years. * * * An explosion took place at the Opera Comique, Paris,

"The gas subledy went out all over the city of Kingdown, Ontario, on Markoy night, while a performance of "faircine" was being given in the Opera House. The management, as some at they recovered from their astonishment, highest up the stage with carolles and Lumps, and the players went through with the rest of the opera with lighted carolles in their hands.

CRYSTAL PALACE EXHIBITION AGAIN. There are 854 Edison lamps burning in the Crystal Palace. They are arranged as follows: Concert Room, 38n lamps, Entertainment Court, 200, Industrial Booths, S4, Central Transept, 48, Railway Station Entrance, 47, Domestic Company, 80, and Dynamo Room, 15. These lamps are run by twelve small Edison Dynamos, on the floor below. so arranged that any of the dynamos may be thrown out of circuit without affecting the light. The current is carried from the dynamos to the lamps by a single conductor. Every circuit is supplied with a switch for throwing the lights on or off at pleasure, and every branch and sub-branch is supplied with a safety-plug or protector, for automatically opening the circuit in ease of accident. No acciilent, however, of any character has taken place. The Concert Room (lighted by 380 lamps) is occupied nightly with various entertainments, and is frequently crowded throughout. It is large and difficult to light, but our light is pronounced perfect by all. Recently, at an illustrated lecture, in that room, nearly one half the lamps were thrown on and off at the tap of a bell by the lecturer, without in the least affecting the remaining lights. The Edison light is the only

one in the exhibition which has not at wine time since the opining game out and left the exhibit in darkness. The follows exhibit has been visued by the Dake of Edinburgh and party rices by the Dike of Westminster, resice by the Dake of Studenthal, also by the Chairum and Heard of Directions of the Middland Rainboy Co, by the Caslinstitute (musdering 1904), and by immunicable delegations from cities, bounghs force, Mr. Johnson as do under engagement to give private exhibitions of the Balson System 1 the Society of Arts, the Royal Society, and many other important holics.

The following is from the London Nature of March 9th:

"The centre of attraction at the exhibition of electricity in the Crystal Palace, formally opened on Saturday by the Duke and Duches of Edinburgh, will compressionally be the show of Mr. Edison. This electric light in the Entertainment Court and the Concert Rosm is by far the baset ever yel made, and is of itself a spectacle to be remembered. No expense has been spared to demonstrate the power and beauty of his incandes ent lumps, and the divisibility of the current to meet the wants of domestic lighting, while Meson. Verity and Soo have seared the occasion to illustrate their skill and show how eminently adapted the electric light is for ornamental purposes. But in addition to its superiority over gas, oil, and candles in these respects, the Edwar exhibit also proves to the most striking mainter its superiority as a decounter light, and its unrivalled capacities for enhancing the article pleasures or our houses. Besides giving off no deleterious gases to tarnish gilding or dim the most delicate colours. the incardescent lamp lends itself to the designer's famics in a way which no other illuminant car; and we may expect something like a resolution in house. hold decoration by its introduction, as well as a new descionment of the basis worker and the glass blower's art."

"OM: Editors we the marits of the incondescent system for domestic lighting at a time when other electric lars were giving all their attention to the are light; and therein absorted his genius and forcesign. For it is evited now no electric lars while the are light is well enough adapted for the lighting of larger areas it is mostilable for somition experiments.

The Metropolitan, London, March 1 th, gives the following report about a suite of rooms at the Crystal Palace, illumined by the Edison light, and meant to show the especial adaptability of that light to domestic purposes:

"The suite consisted of five rooms, and for the purposes of the lighting Mr. Edison's lamps were employed. The arrangement, decuration, and furn-

ishing of the entrance morning room had been carried out by Meson. Win. Watt and Co. The smoking room, fitted up in Japanese style, had been entrusted to Moses, Liberty and Co.; while the disting room has been designed, decorated and furnished by Mesers. Bertram and S or the appointments of the dining table having been supplied by Messes, Philips and Pearce. The decorations and for niture of the drawing-room and bombor had been designed and executed by Mesers, 11, and J. Cooper; and the whole of the embroileries had been smudied by the Royal School of Art Needlework. The fittings for the lamps, together with the girandoles and electroliers had been specially prepared for this Exhibition by Mesors, Benjamin Verity and Sons. The lighting proved most effective, and was much admired by those present. There was an entire absence of all glare, but the lighting was everywhere adequate, the lamps in the drawing room being fitted with small shades, which rendered the effect pleasing in the extreme, In the dining-room the illumination was appropriately brilliant, while in the smoking-room it was more subsheed. The apartment however, which attracted most was the lendoir."

The Engineering, London, March 17th, contains a long and illustrated account of the Edison exhibition in the Crystal Palace.

"">10.11 the chartic lighting system represented at the Crystal Balan, Jesu most complex and important installation is fast of M. Effects, or, more correctly receiving, of the Folion Edge Cross Edge Company, and the who while control of the Folion Edge Company, and the who while administration of incommerce correctly may be the Peterminous Cost and General Roman in the aptivality noticed and installation of the conjugate and General Roman in the aptivality noticed and installation of the conjugate and General Roman in the aptivality noticed and installation of the conjugate and General Roman in the aptivality noticed and installation of the Conjugate and General Roman in the application current, is delinquised by a time principal conjugate and the principal conjugate control in the principal conjugate and well arranged by your fact analysis of the Conjugate and well arranged by system for making the commercial conjugate conjugate and well arranged system for making the commercial conjugate and well conjugate and well of susceptional conduction of the Chaldeline of the Schildeline."

The article then concludes as follows:

"The Effect installation at the Crystal Palace causet fail to give to the Effect of the Crystal Palace causet fail to give to the Effect of the Crystal Palace causet fail to the properly form and extrict all return succhanical point of view, or as an example of highly efficient and devocative illumination, it is optic unsurpassed by anything that has preceded §, and reflects the highest credit upon the Effect Depth Company and upon cereptody who has been connected with the Installation.

EIGHTH BULLETIN.

The Edison Electric Light Company

6c FIFTH AVENUE

(Three bulletins, originally issued as a covernient way of atomicing the impairies of distant agents, are now, response to marrow response, settled to all stock, bulleters, to give them information of the progress of the Company and of other matters of greater or less interest conserted with electric lighting. Agents are particularly response to communicate to the Vec President washerer persistent points of general interest may be developed by their experience in installing or operating our lighting.

New York, April 27th, 1882.

PROGRESS IN THE PIRST DISTRICT, NEW YORK CITY.
In the lass billedine alexalied susment was made of the progress
made up to that time in the First Bearier in New York City. Since
then additional street matins have been hall, and it is begul that if
good weather continues the most of the street manus will have been
put underground by the end of this month. Nothing will then
remain to be done are regards the made ground conductors except to
put in the bridges and councertions at street intersections. Three of
the xim manusoin steam dynamous time been already assembled at
Goerek Street and the other three will be set up as soon as the first
three are out of the ways. A few host east on one of those dynamos
was made but Thursday right with good roaths, and that dynamo
is now being removed from the Goreck street shorp to the Parl
Street Station. A more detailed statement of the progress being
made this month with published into here build billedin.

THE EDISON LIGHT IN ALBANY. The following extract is taken from the Albany Journal, April 19th:

"The next of the Filton Don't Light Gongray is in many static arrangements for the famino flow of the Filton bearders of next the filton transport of the Filton Board Spectra." Tack & Cu, on the convert of State and passes states. These Eights differ materially found to Filonda and Eights which passes states. These Eights differ materially found the Filton and Eights and are statistical to characterise at Eugenesia and an lee highest one composition state, and the state of State and principles and state and Sta

WIRINO IN CHICAGO. We are wiring for the Edison Light the new residences of J. W. Donne, O. R. Keith and H. H. Potter.

UNDEROROUND CONDUCTORS IN RAIODE ISLAND. The Seame Indicate Commune of the Rhode Island Legislature has finished its hearings on the question of compelling electric high companies to place their conductors maler the ground, in Rhode Island These bearings have here speken of in the Founth and Seventh Indicates. The report of the Committee and the hill prepared by them have been hall before the Senate. The Provolence formal, April 22nd., prints the hill in its report of the proceedings of the General Ascendib of April 21nd. Its 1850:

"Senator Borns), from the Judiciary Committee, called from the table the act relative to the laping of wires for conducting electricity, with recommendation that the substitute full pass. The substitute is as follows:

SUTION 1. No person shall erect or maintain through or across say logically way above the surface of the genuine, or a rose the property of aundre without the consent of the connect of the connect of control or conflict a current of relectivity for electric flags, or for harmboling power, or which shall be used to conduct a current of electricity, the electromotive force of which shall be used to conduct a current of electricity, the electromotive force of which shall recurred to order.

SUTION 2. Every person who shall violate any of the provisions of the preceding section shall be fixed unt exceeding \$1,000, or imprisoned not exceeding three months, for each offence; and shall be fixed not exceeding \$50

for each day's continuous out the said venation after the service of the warrant joved upon the first complaint.

SECTION 3. The Supreme Court may by injunction restrain every violation of this act.

SECTION 4. Every wire erected or maintained contrary to the provisions of the chapter, is hereby declared to be a public mission.

SPETION 5. Town Councils and Uny Councils may pressuch ordinances, by-have and regulations in relation to the placing, involuting and use of the wirereferred to its excitor 1 of this act, as they may judge the public safety requires, and may pressible penalties for the violation thereof, not exceeding one hundred dollars for any one offence.

Accompanying the bil was a full and exhaustive report from the comnition, which was received and ordered printed.

The bill was taken up, and after the record by Senthers Borg St., ANSOLI, and WHENE, from the commuter recommending its pressage, and by Senthers FORE and RAFFE, mening its continuance to the May section, it was passed and ordered communicated to the House."

The Lower House received the above Itill from the Senate on April 22nd, and at once referred it to the Juda (15) Committee.

TESTIMONIAL TO THE EDISON LIDHT. Mr. W. P. Potter, the Manager of the Western Union Telegraph Company at Fall Rener, pass the following tribute in the falson light in time in his office: "It is by far the best light I ever saw to work under I is perfectly steady, has a softness that no other light has, and I have no heatstation in saying I believe it has no equal?

PROGRESS IN EUROPE. Pending the completion of factories alreval for manufacturing plants, machines are procured from the Elison Machine Works in this city, where an order has just been received from Paris for eight 150—light machines and four steam dynamos of 1,000 lights each.

EDISON'S ELECTRIC RAILWAY. Below is an extract from a recent number of the Naw York Rawae of the Telegraph and Telephone.

,01

Secreta also of Mr. Ellison's clearly at Morto Park are required, and a lew Aug ago the punds of Horsean A. E. Sants's above, of Bergers Bork, N. J., about thirty in multer, were carried over this model, the destrict at the color bergers mode here. At the experiments of heritagis at the rank of our bergers made be here. At the experiments of a possible of the color o

incate with the dynamo electric machine and gearing in the becommire. Thus is given to the train a noiseless, rapid, pleasant motion, unattended with smoke,

cinders and clatter."

WAMSUTTA MILLS, NEW BEDFORD. The plant of 60 fisies berechos' mutalled in the Wamsun Mills has given such sairs faction that an order has just heen given to to held their new "No," mill, just being completed. The building is 82 y feet long, about 162 her wide, and three series high, and will require about \$670 almost of the control of the power cach. In the wavning room one lump will light four looms. Our orders are to have the plant installed in time to have the light started when the mill is completed.

FORMATION OF THE EDISON COMPANY FOR OREAT BRITAIN. The London Electrical Review, March 23th, contains the following report of the foundation of the Ediston Electric Light Company, Limited, in London, to take title to Mr. Edison's patents for the United Kingdom of Great Britain and Ireland:

"The Capital J, 1,00,000 billished his 1,000 A, or J, S per cent, patter ush stars, and 1,000 til stars or J, for och. Objects it 5 soppies the whole of the letters parent for the United Kingdom taken on by Thomas Ara Elibona I relation to observity or mostive agent, septient with the electric lamps, dynamo and other plant of Mr. Idlom now in Deglant, and capital or letter plant of the plant of the Capital and capital or the plant of the plant of the Capital and capital or the plant of the Capital and capital or the plant of the Capital and Capital and Capital or the posterior with the production of electric light; and also to acquire the loss of No. 57 Hollom Pattern. The production of capital capita

execution. Liptore, and the allowant density for part II stage for each for a signal paint up on centilized a part on received the Ankaro san base (with good-survectable). Also, as the centility of the Consecution St. phase (Section 1988). The Consecution St. phase II should be consecuted by the

Mr. Johnson writes that the Board of Directors of this Company meet at their office in London every week and sit for from three to four loors, and that they also meet infoundity for conference two or three times 6 week in addition.

AMERICAN ELECTRIC LIOHT CO. The Biston and New York papers have recorded the domes of this company in Massaclassetts. This event was predicted in one First Bulletin. The following is taken from the New York Tree of April 24(1):

"The compling was organized with Col. Led Grant to President. Edward H. Goff as Vice President, Engene M. Hersey as Trenourer, and Edward H. Hastings as Secretary: Among the Directors were William Window, formerly Secretary of the Treasury, and other prominent grademen of Washington. A conspictions office was taken in Tremont street, and an rhigant display was made with incandescent electric lights and prominent advertisements. Overtures were made to Cyrus S. Haldesson, the New Encland agent of the Pennsylvania Radiosal Commun. to be one general manager, which he finally accepted, and immediately began operation to place the business on a commercial lusis. A plant was prepared, and the parent company in New York was called upon to machines and lamps, and at the same time efforts were made to place the capital stock up in the market in order to raise finds for the prosecution of the burness and to meet the large payments due to the New York persons. It was soon discovered that supplies ordd not be furnished. . . . Alout two weeks ago Mr. God gave notice to the principal stockleolders, as well as Grant and Monarty, that he could not go on with his contract. in the first place, because of the impossibility to raise money and because the parent company have never given any valuable consideration for the money already paid; that they had no system, no machines,

and no lamps of any value, and that he had never used anything belonging to it weigh the nature, and desired no land over all the papers, contracts, and six lo soom person and noticed to receive them, with the resignation of him self and associates. No attention having been paid to his several request, he closed the office of other company, seek other sparters, and organized another company indirect their title of the American Electric and Huminating Company, losed open contractive with the New Hadian company.

ENGLIBH OAS OFFIOLALS AND ELECTRIC LIGHTS.
Three hundred and sixty members and friends of the English Gas Institute recently visited the Electrical Exposurion at the Crystal Palace, and then direct together. After dinner, the President, Mr. G. Wilson Servenson, C. E., F. G. S. unde z speech. Speaking of of are lamps be said:

"The art, lamp is quite out of the remining for democile lightning; I to the markets, ent lamp andres high as nearly perfect, when it is an less, as any artificial light van les. I can insugine that there are those among or whom like disposed to grow that a to alimn that it is mostly as good as its cardle gas, when homeon barde the less conditions. There are incumstance, when I could not once that the insurance and may usually the preferable to any other light, either of only gas we for instance, a resistince in the ropic, with the thermounter a year in the shade all they gar around,"

Regarding the effect which the electric are light has thus far had upon the gas business, the following additional extract from the speech is of interest:

"The Electric Light is doing to good there is no doubt whatever about in 1 is to but an encey but a friend. People have learned how a long; lick may be produced by artificial means. They week to have more high for themselvers, and they say to us. "Any ong he no a letter light from party of the control of the same of the produced by the same of the same of the same time the same of the sa

LIFE OF LAMPS. We are gradually accumulating valuable information about the life of our lamps. Experience shows that when a plant is started, one or two lamps may break at once, while some

last say over two thousand homs of actual laurning. What is unportint is to ascertain the average life of the lamps. At the Hotel Exercit, New York, fifty-two lamps were burned 152 hours before a single lamp gave out. That is an exceptionally good run. Mr. George 11. Bliss writes from Chicago that the present average life of the lamps in Messas, Rand, McNally & Co's plant is 623 hours; that the average life at the United States Rolling Stock Cox is 639 hours; and that the average life in the plant of Messrs. Marshall Field & Co. is, up to the present time, 603 hours. The above three plants have recently been installed and have not been burning long enough to show the real average. A recent test of 23 different sets of our lamps shows an average life for the entire 23 sets, burning at 16 candles, if 165 hours. An interesting laboratory test is that of 16 lawps, selected at random at the Lamp Factory, at Menlo Park, and started burning, at 16 camilles, April 18th, 1881. The date of breakage of each lamp, the number of hours burned, and the

werage life (which was 1.425 hours) are even below

DATE OF BETALING		HOUSE READER		
April 18, 10 25 A M.	9	beurs	20 minut	
May 10, 11 P. M.	174	**	20	
June 15, 405 P. M.	753	84	3	
" 29, 5 l'. M.	9 tS		38	
July 7, 4-30 A. M.	1,017		13 "	
Aug. 30, 4 P. M.	1,600		16	
Sept. 9. 2-30 P. M.	1,787		11 **	
" 16, 4-45 P. M.	1,920	**	31 "	
Nov. 14. 4-25 P. M:	2,817	**		

Average life 1,425 lours.

All the above langis gave an economy of six lamps per indicated horse power. Most inventors in incundence in lighting, it considering the life of a lamp, out the equally important question of compare for horse force. But it must always be remembered that the life of a lamp mentant as the number of lamps per horse power discount, and nic versus:

167

THURBER'S PLANT TO BE INCREASED. The new engine in the wholesder procety store of Messos, H. K. & F. B. Thurber, & C. N. New York Coy, last been placed in position, and the light is going such pool satisfaction that the form has ordered an additional dynamo, which will double the present semiler of lamps, and make them sufficient to light the principal parts of the store.

THE EDISON LIGHT AT EATON HALL. We learn from a recent London letter that the Duke of Westmacter, who requires z. v. lights for his country seat at Faton Hall, has determined to adopt the Edison System. Faton Hall is well known to traveller, as being one of the finest, if not the very finest, country sen in England.

PLANT AT HOLYOKE. The Metrick Thread Works, Holyoke, Mass., has ordered a plant of 12 - B lamps

THE CRYSTAL PALACE AGAIN. The London papers contain bengthy accounts of a recent visit by the Prince and Princes of Wales and suite to the Electrical Exhibition at the Crystal Palace. The following is from a long account of their visit published in the Chemich, March 27th:

"The Einsteinment Court, howeful in the Spirite in Theorem is being a few Times. There Mr. Direct, the Court is the Court in the Court

the Crystal Palace, 1882, with the compliments of Thomas Aira Filison, Mendo Park, New Jersey. 1

The following is taken from the London Times, March 27th:

"The Princes seemed particularly interested with the Elison exhibition of incordercent Biomatain in the Emercianness Court. Here the was pleased to accept from Johests. Elison and Verlay, as a sometim devise is a reychaming elevist Lung. It takes the chape of an arishtidily arranged longuest of beaves and downers in dividerly disastenced beaves and, with an incordescent elevine than princip from the centre, and partially hidden assent the longuest disastences."

The Talegraph says:

"the the Emertalization Court Mr. Johnen percents in the Princia and West, we belief the Eribios and West. Verity, an incidental improved in maximization channels, tasks and the a threat lamper, and other processing the second of the contrast of the cont

The following is from the Sandard:

"The functionment Learn x as a companing the first handword below of he Boloon. Me, Boloon, his other cycles or country, timen of some times the most parameters of fight in the progress and (gains) of the flavor destination more grain algo, and no is, then of them of all on the flavor of them flavor of them flavor of them flavor of them all alight again negative; based incurabs country on the flavor of the market healthcorried is considered the large country districts of the market flavor of the flavo

The London Daily Aura, April 8th, pays a handsome cor altinent to the Edison System. It says:

. ..

The London papers also contain lengthy accounts of the visit of Mr. Gladstone, accompanied by a distinguished party, to the Crystal Palace, March 2.4h. The Chronide speaks of the visit as follows:

"The video adversaries was to the labor visitions across where the green recovered by Ma. Delimon, the inventor representation with country. The greenforms briefly eliquated the Bilicon ystem, which he said was based as the same plant of the parsed in the production and administrated gas, They had first there had attain of generating, not the distributions of years, the said there are that the plant of the part of the plant of the part of the plant of the

THE M-GORMICK COMPANY, CHIGAOO, TO BE LIGHTED. The McCormick Harvesting Machine Co., which was established in 1831, and is the largest of its kind in the country, has given an order to the Isolated Company, for an Edison plant of 130 B lamus.

A LONDON ORUNGH LIGHTED. NO HEAT. The City Temple (Dr. Parker's chunch in London) is lighted by the Ebbard Light. The current is furnished from the Holborn Vaduet Station. Heretofere the church has been lighted by 700 mmll gas jets, which have now been replaced by 170 Editon lamps. The heat from the gas was oppressive, and the absence of heat now that the Edson

light is used is very nonceable. Mr. A Odell, the jamor of the Church, has much craried observations of the difference in temperature, the states that the general temperature when yaw was read, was from S_2^{μ} to S_2^{μ} , but that the new of the electric light has reduced the temperature about x_0^{μ} . His record shows the following as the temperature of the church on the several Similay meanmost make it was the state of the district and the state of the state

HOLIONN VIADUOT GENTRAL STATION, LONDON. This Station is now is succeeded operation. The current generated by two Edison steam dynamics, is distributed by means of underground conductors for about half a mile, illumination being familied for one church, many stores, street light, and a part of the London General Post Office. A full account of this central station will be published in an early number of the Bulletin.

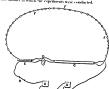
MR. CLARKE'S REPORT ON UNDEROROUND CONDUC-TORS. The following is a report mode by Mr. Charles L. Chrke, Engineering Department, Edison Electric Eight Company, at the request of the Jiniciary Committee of the Senate of the State of Rhoole Island, with reference to underground conductors for electric

To the Hemmilte Committee on Judiciars of the Sante of the State
or Rhode Island, in reference to the disposal of wars to be send for friedric
licities.

In accordance with my promise, made at the last hearing betting your committee, at Providence, March 14th, 1882, I have carried out experiments The Declaration of the properties of the propert

Both the oxigosug, and incoming portions of the circuit were carried outside the building, and in this portion of the circuit were interpolated the tends to experimented upon

The following diagram with accompanying description, will fully explain the manner in which the experiments were conducted.



1.2

A and H are the dynamic (Book). C now founds no Copy of subsets governed outside are a simulationally by the Evert. Take C in C consists of two copper risks, each equivalent in size to two N_0 to whise, B, W, C is the copy of two copper risks, each equivalent in size to two N_0 to white, B, W, C is the contribution C and a new field C in C is the C in C in

Disa postion of these two circuits made of two tarty text faughts of No. 4 from wise, B. W. G. insulated by a covering of kerite yields of an inch thick. These strands are traited together and mode noto a lose coil. [I will state that the wife had been in stock for some time and was builty material. These faults were required by dispung the parts or spects on the Bettack Tulie.

compound and serving with cotton (delt).

A consist of two copper plates between which one thickness of ordinary letter paper is trendy changed, forming the only in-ulable between the two.

If is a lead wire introduced into the circuit to prevent injury to the

H is a lead wire introduced into the circuit to percent injury to the dynamowin case of acceleratal short circuits or development of faults, occurrence of which would cause the heavy current induced to five this lead wire and internut the circuit.

F. F. E. is the lange circuit.

The telle Cand ord of wire D were basied undergoored, and the ground at D was thoroughly saturated with water. All come two under underground were protected by covering them with the Heritic Tolle Compound. On Friday, March 24th, the system was operated for two hours and a

half senhout developing any fault.

This is ample time to practically proce the total inability of the electrical presume under which are light systems are operated, to break down and

dimpt even what would be called ordinary insulation.

It touble not disrupt paper four oneath-analths of an inch thick, did not injure the kerite-covered wire which upposed a total thickness of 3-12 of an inch, and produced no effect on the Electric tide, with conductors separated

inch, and produced no effect on the Electric tube, with conductors separated by one-quarter of an inch of compound.

All that remains to be shore to make this underground system reliable and durable is to present hardening and cracking of the insoluting material by

All that remains to be shown to make this undergound system retained and braddle is to prevent hardening and carchang of the installing material by protesting it from the air or fresh water and goes, by a suitable convening terred horse has been employed with the lest reads, to primite suitable protection against probable mechanical injury, and to provide means for making test of the electrical condition of the line and amount of clackage, and to elected the describation of any perion of the vysem and lest the fault.

in the underground line experiments a part, the Edictic Tule provides insulation and protection from water, air, gases and mechanical injury, and the system, in connection with which this tule is employed, is arenaged to as to provide means for leading and locating faults.

The following is descriptive of so much of these systems as will be of interest to your committee, bearing as it sloes upon the point at issue. The met system mentioned is at the Royal Albert Dock, London; and, at the time of metallation, there were three seven-lamp and one six lamp ritenits operated by Siemen's dynamos. The underground conductors supplying this system, the area laminal is six thousand two handred feet long and four hundred and miney feet wide) are constructed as follower A copper straid covered first with gutta percha, then with tarted hemp, then with a sheathing of twenty. the gots person, one was cours, using any was a section of every-tice for wire, and the again is served with another layer of tarred juny, and finally there is a coating of Chatterton's compound, (a mixture of Stockholm tar, tesin and gotta perchap so that the molecurous wives are in every way, as carefully protected as is the conducting core of a submarine calde. is no specially provided return our uit, for the irea wise sheathing of the cable cite nits plays that part. This provision for a return rice nit is to be depressated. The dorances between the lamps and machines, as measured by the connect The outsides sections the samps and into more as a section of the sample For original description see "Engineering," Vol. XXX., page 276.

The second sistem mentioned is at the docks, port of Havre, France, The number of langes on a circuit varies from four to six, with a total monther of thany three on six circults. The length of these circuits varies from three thousand right him had and twenty-right, to twelve ill-ousingle seven hundred and much two test. The cable is constructed in the following manner: A central core of seven strands of copper wire is enclosed in a sheath of rubber, oser which is placed a series of protective coatings of gatta perrha, unider cloth, and three thicknesses of parathred hemp wound alternately in opposite directions; then tollors a covering of galvanized iron wire, and finally a thick ness of hemp. The myresity of this great prevaution in protecting the cordin tors will be understood when it is remembered that the cable has to pass through five locks, so that for the greater part of its length it is under water. One accident to a circuit occurred by the rupture of a water main behind which the cable was placed. This was rasily repaired by splicing,

The description further states;

"During the last six months the installation has been in full work, and has been of great service." See "Engineering," Vol. XXXIII., page 6.

Exercise statements have been made in the newspapers to the effect that, granting the fact that underground another tree can be made so as to withstand the high electrical pressure required to operate a citemit of torty or fifty are lights, and to remain in good condition for a reasonable number of years, the ant of leakage of electricity will be so great as to prevent the countervial sincess of such a system; and that for this reason only six lights, or ten at the most, could successfully be operated on one underground circuit. 1441

These statements are now so often made, and are becoming so generally believed by the public, who are enour ged in this belief by the advisores of overhead conductors for an elight systems, that it seems necessary to state the truth about electricity in this respect, especially since exerciting that is mysterious, capitions and untries is readily attached to this much abused agent, and as readily believed by the public.

The conditions of the problem have been assumed in such a manner as to make the leakage even greater than what it would be in practice, and are as follows: Forty are lights operated under a total electrical pressure of two thousand solts, are placed at intervals of three foundred feet apart, making the total distance twelve those still tret, and the entire length of curvet twenty-door thousand teet, or more than four and one halt males.

The roaductor consists of a No, to copper wire covered with an involution of best guita-percha one sisteenth of an inch thick. The outgoing and incoming parts of the circuit are placed close regether and supposed to be surposeded by some good conductor candidated water for examples

The resistance of the insulation of the double valid will be fits million of oline per mile. This resistance opposes the leakage. The total leakage, expresed in work, will amount to two and scents were hardredde to the corunte. A good idea of the progrational loss is given by knowing that it is only the one closes thousand have but drolling at on we have power,

The amount of energy in the timps will to that's home power, or which the lookage is twenty eight one hundred though the party time per cery. In order that the leakage may amount to as north a one per cent, the insulators would have to deteriorate to the one thing in hondrolth part of what it is when at its lest. Hosper's india rubber is isomer-headred per cent, better than cutta-nercha as an insulator

As long as the insulation of an unclerground conductor is tur and without actual Jecaks or trults, the leakage in that portion of the circuit is not of the slightest consideration, and it is incorrect and undeading to assume that, from a commercial point of view, at can affect the questions mising in regard to underground conductors. When a leak becomes or subidirat magnitude to affect the economy, it is through a break or fault in the insulation, which would, of my easity, have to be required.

I wish to quote at some length from an article which appeared in the "Telegraphic Journal and Electrical Review, Vol. 1X.," and which bears directly upon the prestion of finulation and durability.

"There is undoubtedly a very general impressor abroad that high insula tion is, above everything, the indication of a sould and good norking line, but there cannot be a greater mistake than to appose this. In certain cases, in gutta-percha for example, excessively high insulation is an indication of a poor quality of material, a quality in fact which is not durable. * * * This is not all, however, for even supposing that high itentation can be obtained consistent with durability, there is nothing mixtorer gained by a high result a regulative working white, in fat if it is positive advange to have a modulous, possible the latter due to the theories where white breaking and and not a affect in "." The author refers positivatily referently and and not a affect in "." The author refers positivatily referently in the same works apply with equal two ve decits figlet containers, "that is it is very receivary by the found were of checking the otherwise," and it is very receivary by the found proper the working," (of infragaph times, "shall the much meet likely to spill they communit variation, beared to let due to a definite of the based on the same position of the based on the same position of the contraction of the same position of the same position of the transmitted current with the position of the according red to the receiving out of the provinges of the contraction of the provinges of th

Thus it will be seen that a very high insulation is not needed in electriclights underlargement conductors operated under high pressure, for the loss with extremely low insulation will amount to leat a small fraction of one per cent, of the total current; but dearlibby is the object to be obtained. New York, Markh Josh, 1882.

Respectfully submitted,
CHAS, L. CLARKE,
Engineering Department,
Edison Electric Light Co.,
New York City.

NINTH BULLETIN

The Edison Electric Light Company

M TIPLII AVESUE

(These bulletus, originally loued as a conservant way of anone ring the impulses of distant agents, are more, in response to moments respect, with do to all sock-bulletus, to eight term information of the progress of the Company, and ot other matters of genetic or less interest connected with deviate lighting. Agents are particularly respect to communicate to the Ver. Product with surfaces practical points of general interest may be developed by their experience in installing or operating our fight.

New York, May 15th, 1882.

PROORESS IN THE PIRST DISTRICT, NEW YORK CITY, In the Security Indiction and adealled account was given of the progress under up to that time, and the less findlem commed additional information. Pivor to April 1st, a link cover 1500-5 feet of street undergosomal conductors had been lot, including many on the block fronts, street intersections and loveless. Work on laying intersection subjects and loveless. Work on laying intersection subjects and loveless. Work on laying intersection subjects and loveless. Work on laying the next mostle 1st yave per latin. In April these were at working days, that is to say, days in which the weather abunted of our going on with our work. Of this time 15 lays were devoted to the laying of conductors, to to safety-earch boxes and their connecting mains, and one to service connections with oness. The administration of the laying of conductors, to loss safety-earch boxes and their connecting mains, and one to service connections with oness. The administration of mains haid during April was 11250 feet, making about 61,700 feet.

remained to be laid, approximately, 14,300 feet, including not only street mans, but also connections at street intersections, feeders, and some extra mains specially required; also 47 street intersection salety-catch boxes; and 48 bridge safety-catch boxes. The present total estimate of underground work already done and yet to be done is about \$2,000 feet, including all mains, feeders, bridges and intersections, but not including any house connections under the sidewalks. Regarding the safety-catch boxes, it may be explained here, that at each street intersection a large cast iron box is iduced, called a "safety-catch box". All conductors coming together at every street intersection meet in this box, and are so connected that any one can be separated from the system for the purpose of testing its condition touching insulation, or for any other nursese; also each conductor is automatically disconnected in case of a serious "cross" connection or "short circuit" within itself, an occurrence which will happen only in case of severe nucleanical many. The box is accessible through a large hand-hole covered by a heavy fron lid. Three of the six dynamos, mentioned in the last Bulletin as having been already assembled at Goerck Street, have been moved to the central station on Pearl Street and are now being erected there. The other three will follow as soon as the first three are set up and out of the way. The small engine is also now in place to work the blowing apparatus and the conveyors for coal and ashes. From this account it will be seen that rapid progress is being made towards completion. and that before many weeks the light will be turned on in the First District.

MR. BENNETT'S YAOHT, NAMOUNA. Mr. James Gordon Bennett's yacht, "Namouna," has just been lighted. There are 126 of our It Lamps (8 candle power), and the dynamo is driven by a 6½ x 8 engline, the steam for the engine heing supplied from either the main botten or a donkey holler, and the exhaust steam being deliven.

cred rither into the condense or through the side of the vessel, as may be desired. In addition to the general arrangement of lamps through the calibra and selsoons, lamps have been placed in the shaff alley, where there are no means for conditions other than through the engine room, and lamps with loops feedile connections have been furnished for the belief and engine room, so that they can be curried to examine my part of the machinery of points.

TRENTON, NEW JERSEY. We have received an order from Mr. William Hewitt for an isolated plant in the ware mill of the Trenton Iron Company, to replace an lights. The plant is now being morellied.

THE ORAMIC COMPANY. WITY WE ZOUND IT. The recopporate messages comments do not no means the strains or Company are messages or manual to Estimate Company are messages. The inference from them is but there has been a sort of company has suremajored its automory and merced teeff in another organization. Nothing could be more erroners. In Economic Company has suremajored its automory and merced teeff in another organization of certain electrical compones for mutual consequence in a mutual consequence in a mutual consequence in the company is simply as a mison of certain electrical compones for mutual consequence in the company is simply and in the more through the company is supported to the company in the more than the company is supported to the company in the company is supported to the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company is the company in the company in the company in the company in the company is the company in the company in the company in the company in the company is the company in the com

The Gramme patent (U. S. patent No. 125, 57, granted October 17th, 1871), is for an improved dynamic, or, as the patent reads, for improvement in magneto-electric machines." In May 1879, that patent was offered for sale to our Compuny. After taking the and the state of t

advice of Mr. Edison and our counsel in patent matters, we decided not to buy it. Among other reasons for our refusal was the fact that although most other inventors used the Gramme patent and made a machine more or less like the Gramme, Mr. Edison's machine was made upon an entirely different principle, and did not infringe the Gramme patent. After our Company refused to buy, the patent was sold to another company. Early last year that company thought that inasmuch as most of the dynamic machines, aside from Edison's, infringed the Gramme patent, a union of the leading light companies might be formed to purchase that patent, to then license each other, and to thus obtain a practical monopoly of the electric light business. In March 1881, our company was invited to take the lead in getting up such an organization. After eneful consideration we decided not to do so. We reached that decision for the same reasons given above for our not originally buying the Gramme patent. Subsequently, however, the proposed union was effected without our Company, and on April 2 ali, the present Gramme Flectrical Company was 6-rued, our Company still declining to join it, but a vacancy being kept for us.

Matters commed in this shape several months, until, in August, conference committees were appented on the part of the Gianne Company and on one, to see if it was not for our interest yet to join the union. The augments presented to us were, first, that the Grammer Company was rendering both the public and ourselves good service in externitaring disborest and incompetent light companies, obstacled and backenfulley companies springing up almost daily to steal our patents and otherwise among us, in the loopes of being hought off, second, that a large amount of detail work of nutural interest to all patters engaged in electric lighting could be slowe by one central organization, thereby saving the expense and trouble of each company's doing it for field, and, third, that the general business of detertic light-doing its for field, and, third, that the general business of detertic light-

ing could be harmonized and mode to work with less friction and expense, if the leading companies vould nine as policy of milloratiny of prives, of referring disputed some to arbitration, and of quickering and chapeaming jastent historion between themselves. One of these againments, namely, milloratiny of proce, had fittle influence with us. We were and are engaged exclusively in incondescent lighting, of which we have a monopoly, whereas all the other companies are engaged in are lighting, wherein the competition is force, and they of prives, the other arguments had great weeds with our communities, and in February, this year, they persent do our Company in favor of our joining the condination. We deand no dish faily in arranging satisfactory terms and conditions, and in March we accordingly became members of the Gramme Beltontal Conjunct.

From the above statement of first, it will be sen that we have in no sense whatever surrendered our individuality, parted with any of our rights, or, even in the slightest degree, aftered our established position as sole inventors and exclusive proprietors of a system of inconfess ent lichtime.

BERLIN, OERMANY. The Berlin Stock Exchange Newspaper, called the Berliner Borron Courie, is lighted with one of our resisted plants. The issue of that paper, April 13th, speaks of the light as follows:

what the printing establishment of the Ecolour Berram Corner, this was two destrict manifescent lamp has no the traction telling, because two destricts makes passed as what the source too engine when the principal districts. Surplamps for which the source origin when the principal districts are produced for effective. Askie into the collectal corner where the electric light has born introduced, we still only open of the effect of the electric light in the composition when the engineering the contribution of the effect of the electric light in the composition when the engineering the effect of the electric light in the composition when the effect in the experiment of the effect of the electric light in the composition when the effect is the experiment of the experiment of the effect of the experiment of the effect of the experiment of the experime

HOW OUR UNDERGROUND CONDUCTORS STAND THE WEATHER. In order to make connections at the street crossings in the Pearl Street. District, we have recently been obliged to expose the ends of the underground conductors which were laid early last Autumn. We find upon testing them, that they have stood the winter weather without the slighest deterioration, and that they test perfectly, just as when they were tirst land.

PLANT AT PASSAIC. A plant of 120 eight candle B and 12 sixteen candle B lamps has just been successfully started in the Woolen Mill of the Rittenhouse Manufacturing Co., Passaic, N. J. The dynamo is run by water power, and the plum is used all night.

PURITY OF GAS AND ELECTRIC LIGHT COMPARED. We quote the following from a recent interview with Mr. Edison, published in a western paper, on the subject of electric lighting and of its merits as compared with the existing gas system:

"Gas is a harbarous and wasteful light. The distribution of gas through a city is done by means of an immense system of sewerage pipe, through which it is forced and kept under pressure - a gas recking with impute material and made by a dozen different processes. This gas is allowed to ex-ape through holes into our apartments where it is burnt, taking oxygen from the air to support combustion, the products of which are curbonic acid, carbonic oxide, sulphuric acid, sulphuretted hydrogen, and a host of other substances, which 154

ritiate the atmosphere. It thus gives 68% per cent, more heat than light In fact the result of the sile poson is almost entirely heat and only incidentally a little light. It is a yellow light, too, and far removed from the color of teatural light. And it is charged for by quantity and not by quality, for it is passed through meters which measure the quanty and not the quality of the light certainly a wrong system. At the worse of supply the crude material from which this gas is made, namely, the coal, is passed through a distillation process, from which it is liferated from the other constituents of the enal, more or less imperfectly. It is then stowed in the galemeter ready for distribution, This is one half of the process. The other and final perion of the process takes place us our sitting and bed-rooms, much to the detriment of our health, our sight and our bousehold efforts. In other work, matter is sent into dwell ings for the estensible purpose of producing light, whereas its main product is

"Well, how as to the manufacture of the electric light, Mr. Edison". "In the case of the electric light nothing a sent into the house but energy whereby the light is produced, and a very small amount of local, about 6% per cent, as compared with the auseunt of light. It does not theker, it does not vitiate the atmosphere. It shows colors nether natural lines, and does not burt the eye. The meter measures quality and quantity both."

HOLBORN VIADUCT CENTRAL STATION, LONDON. The district helited by the Holliom Viaduct Contral Station, London, is onehalf mile in length, extending from Hollsorn Circus along Holborn Viaduct and Newgate Street to the General Post Office. From Holhorn Circus to the Viaduct Tavern at Giltspur Street, the conductors are placed underground in the "subway," a sort of subterranean tunnel to contain gas and water mains; and from the Viaduct Tavern to the General Post Office the conductors are carried over the tops of the houses, a distance of about one-fifth of a mile. The Central Station, where the dynamos are located for generating the current, is located at No. 57 Holborn Viaduct, nearly opposite Spiers and Pond's Hotel. The laurps are arranged on four separate circuits, instead of on a stugle circuit, an arrangement adopted as the most convenient for illustrating, by extinguishing only the lamps in a single circuit at a time, how readily, by a slight movement of the hand, the lamps on au entire circuit may be instantly lighted or extinguished. General-

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ly speaking, the subdivision of circuits is as follows: one circuit on each side of the street from the Central Station to Holloon Circus, and one circuit on each side of the street from the Central Station to Old Baley on one side, and from the Central Station to the General Post Office on the other side. In the first circuit there are 66 street lights, also 78 lights distributed to none buildings, the occupants of the buildings being the firms of Negretti & Zimbra, Sharp & Co., Vaschine Co., Hodge & Essex, Holland, McConnell & Co., Steal & Garland, W. D. & H. O. Wills, Terry & Co., and J. Buck. In the second circuit there are to street lights and 49 lights distributed in seven buildings, and among the following pattes, to wir: 11, S. Ward & Co., Smith & Son, Dreydell & Co., Boyle & Co., Jenks & Wood, and the City Rubber Stamp Co. In the third circuit there are 27 street lights and 162 lights distributed among the following consumers, namely, Spiers A Pourl's Hotel and Restaurant (68 lights). Monington & Weston, London, Chatham & Dover R. R., Coventry Machinists Co., Perry & Co. (24 lights). Pall Mall Flectric Association, Meriden Britannia Co., Holhorn Lancet Co., Levy & Nephews, and the Imperial Hotel (27 fights). In the fourth circuit there are 31 street lamps and 172 lights in Lusher & Son's and the City Temple. There are also 232 lamps in the company's Central Station, 31 in the Viaduct Tavern, and 50 in the General Post Office. The total number of lamps thus used is 938. Besides these there are also additional lamps distributed miscellaneously, bringing up the total number of lamps to about one thousand. The street lamps are 32-candle power, there are seventy-four 8-candle lamps, and the balance are all 16-candle.

WHAT THE LONDON PRESS SAYS ABOUT IT. The London papers contain lengthy reports of the successful starting of the Holdborn Viaduct Station, and judging from them and from our office correspondence, the event must have created a marked sensation in scientific and financial circles. We have room for only a few extracts from the horizon papers

The London Tima, April 13, said:

"A demonstration of Mr. Edison's system of lighting the buildings and streets of a district may now be seen in London. Trees Newpare street westward across the Hollorn Vanhet, to Haton gaptin, the street and most of the buildings on either side of the street are now, and we the next two months. will continue to be lit by Librar recards one Iraque. For the purpose of street lighting two of the incaseles ent lamps of 37 - mile power each have been placed in every lamp post in this section. * * * Those who carabbani permission to see the machinesy and appliance for which the electricity is guerated and distributed will test a southerary more to the question which has often been asked during the last tour or the year. What is Mr. Dison done? * * * For the first time in the hotory or civeric lighting, he would claim, there is here perfected a system or cluster al supply, conceiting of means by manufacturing, regulating, distributing, and measuring electricity by meters for purposes of general cocomption by all the objectance of a lower and not by a tow individuals, whether for lightest, for driving machinery, supalong electric bells, working telephone, eater on other purpose to which dottesty is new or may beneated by partials a to the maintenance. there is in the basement of the premise of the File will are 1 glat Company. (Launted), No. 57 Hollorn Visdoct, the large dyservernasium, by which all the lights in the district, nearly 1,000 in member, are supplied. It is called a thousand light machine, but is capable of supplying more. That is to say, as with the machines at the Crystal Palace, Mr. Pdison prefers that, as a matter of comony, the machines shall be worked occaderably below their peace. One noticeable point in the system is its afery. The dastral pressure, to but row a term from the system of gas distributors, is so low that a child may hold the electrodes without danger; and with regard to the sately of the lamp, a leadherchief being placed over one of the glob- and the glass being shatterof, the instantaneous extinguishing of the light he the destruction of the view min is all that happens. The hundken hiera users engel. The dynamimachine is worked by a Potter-Allen high presure engine of typhores power indicated, causing the armature to make 330 revolutions per minute. General for and steam engine are firmly rastered together on the same cast-iron test plate, the engine driving the armature, who has mounted on the crank dian, directly and without the use of belting. Southers of qued is further insured by a sensitive governor, and as lights in a cucual are turned out, say when a theatre performance or a church service is over, the surery of the lamps remaining alight is provided for by a resistance regulator moles the care of a man in the photometer and dynamometer room, the engineer proportionately drain ishing the work of the engine. The armatuse is lept cool by a small blow-

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ing fan, driven by the engine. * * * Small plugs, each containing a piece of cast war, which will first and break contact should the current become too stong, serve automatically to protect the carbon filaments in the lamps from any sudden and accidental melt of the tricity to one point in the system. The conducting mans are copper to be insulated in perpared word and enclosed in itou tubes to present leakage. Another remarkably ingenious passe of apparatus is the meter for measuring the quantity of electricity consumed by each customer. This is a bottle containing two plates of rise in a solution of one sulphate, the current in passing raising the one plate to increase in weight at the expense of the other. As, however, if the whole current passed through the lottle this change would go on too rapelly, a properly proportioned shirtle wire allows just a 870th of the electricity going into the bouse main to pass through the meter. The estimate of the quantity consumed is made once a quarter, or as often as may be consenient, by weighing the plates in the bettle, a second bettle being supplied, the plates of which the consumer may weigh for himself as a check men the company."

The London Standard, April 13th, contains a lengthy notice from which the following is taken

The Edison "system" is the tangible reply to the question he set Ismoelt to solve in the way he individually thought best -the it possible to employ electricity as an illuminating agent, not musely as an accessors to gas or as metal in exceptional cases, but as a practical and rehable means of illumination, afe in use, readily adapted, certain in action, and accurately measurable?" This is a wider problem than the production of a useful electric light, or the -ul-livision of an electric current into a few lights; the difference, in fact, being the difference between producing an electric light and a system of electric lighting. * * It is understood that the present installation will be made to give exact details of cost of plant, maintenance of lighting service, and all other details, necessary to enable an absolute comparison of the actual cost of the Edison system to be made in regard to the comparative lighting of the same district by gas. In two months a report to this end is to be made by Dr. Hopkinson and Dr. Fleming, and published to the world."

A BOSTON PAPER ON THE LONDON PLANT. The Boston Daily Advertises. April 20th, prints the following notice of the Holborn Vinfact Station, London:

"A demonstration of Mr. Edison's system of lighting the buildings and streets of a district may be seen now in Loudon. The district lighted Is supplied by four circuits, and there are nearly one thousand lights in all. For example, in the third circuit there are turney-four street lights, and nine lights in front of the London and Dover railway station, together with lights in watchon-ca and restaurants. In the office on the Hollson Vacluet is the dynamomachine which supplies the district. The claim for this London exhibition is, that for the list time there is shown a period system of electrical supply, means for manufacturing, regulating, distributing and measuring electricity by meterfor general consumption. The equable distribution in electricity over the ditract is a prominent feature in Mr. Edwer's plan, so that at any point of the weres a lamp attached will have the same illuminating power as a lamp at any other p 'at. Steadmest of speed to occurd, and when lights in a carent one turned out, the sarety of the lights remaining lighted is moved by a resistance regulator in charge of a man in the dynamometer from, the engine's speed being starkened in this proportion. The electric pressure throughout the circuit is so low that a child can hold the electrodes without risk. Another illustration of the safety of the system is given by the experiment of placing a handkerthief over a globe and skattering the gloss, the only nesult being the extinguishing of the light by the distriction of the vacoum. The insurance companies take the risk of the central office at in exceptionally low rate, though lumidrels of lamps are there to unrease the slarger of inputy to property. The question of cost depends at present largely upon calculation. Mr. Edwards London agent claims that the electric light care be given away, it need be, so large will be the revenue from resting electrony for other purposes, such as the movement of northwesty, telephones and electric bells, The success of the experiment in exercise lighting is undoubted, while the comparative safety and expense of electric lighting are matters to be determined by full and continuous experience.

MISSTATEMENTS ABOUT TWO PLANTS CORRECTED. At a meeting of the Society of Arts, held at the Institute of Technology, Boston, Thursday evening, April 27th, the subject of electric lighting was discussed. During the discussion an officer of a gas company in floston, in the course of his remarks upon gas and electric lights, made certain statements regarding the economy and efficiency of the Edison light. He illustrated his remarks by stating that at the Pemberton Mills, Lawrence, Mass., "the Edison system was not working well, that for 140 "B" lights there the power required had been demonstrated to be largely in excess of the amount as stated by the Edison Company, and that the Pemberton Company had been obliged to stop the dynamo frequently on account of heated bearings". In order to test the accuracy of

this statement, the Manager of the Isolated Company at once wrote to Mr. Clarke, Agent of the Peinberton Company, and received the following reply:

"Promo tox Coursey, Agent's Office,

I. Norta S., Moo, May 18, 1888.

M. F. Moota, Eq. 1 Semral Manager Films of sugary for Inched Lighting.

Da va Sto, I am in receipt of yours of April John, referring to a statement and est a merting of the Society of Air Model in Boson in the evening of April 27th, by a "Representance of a gost to support," concerning the Dalom paperation in operation at this mill. These weighted breastly the matter, and the present in charge of said apparation state data be law users mode any accordance of the Society (Society of Society Society Society of Society S

First. We have never run 140 °W lights. We are muoning one of your dynamics with top 'A' lights, with considerable less power than you have ever changed for it.

Second. The dynamo his never stopped one moment from headbearing, and scarely a moment from any came whethers, since it was introduced here six months age, except during the stoppage of the works. It has rea stoudly feel been each day case starting, and is as unresult and six tractery to day as upon the day of its distribution.

Yours tridy, F. E. CLARKE, Agent."

At the same meeting in Boson, statements similar to those made about the Penductron plant, were also made derogatory to the Edward plant burning in the establishment of John P. Squire A Co., East Cambridge. Were once acquainted that fine with what was said, and have received from them a letter stating that the reflections were entirely grounalless. They say that the plant is in goad condition and therethey consider the light all that it was ever recommended to be; and as regards the power required to run the dynamo (which we stated to them and have verywhere stated would be alsont 8 10, Pc.), they say; "We have run the dynamo about a hours a day at not over y or under 6 horsepower.

Ordinarily we do not take the trouble to deny misstatements about our plants, but we do so in this case, for the reason that the statements were made with a good deal of particularity, and in a public plane, and in the presence of an important looky of men, who are entitled to know the truth.

DYNAMOS IN MULTIPLE ARC. Mr. Johnson has been ming it Z dynamos in multiple are at the treat Plane, also two Elifons stem dynamos in multiple are at the Total Plane, also two Elifons stem dynamos in multiple are on the Hollson Vaduri, and he states they all work to prictions. This successful attempt to an two manimuled dynamos in the sume criterate as a certail of such scientific importance as to be entailed to especial mention. It was done for the first time on the might of Apris with, 1822, and twok place make the directions of Mr. Johnson, at the Edwon Central States on Hollson Vaduria Lambon.

REPORT OF W. H. PREIGE ON LIESCEPHO LIGHTS. The following peop. obtained in Lordon to Elevans, samined, Espefacilities, and the Lemman Telegraph Company of Gardal, Janbern presented to the Canada Gardano on. The paper first a general untrest as showing the exist present state of the new art of better. Lighting, and a principled inverse as showing the writers preference for the Edison System. Mr Process the Electrician of the Brights Postal Telegraph, and see no constant attention on at the recent Electricial Exposition at Euro, as Commissioner of the English Government. An existant from this reports was printed in the Systh Italicia, but we more report the paper entire as it comes to so from Canada.

"Report by W. H. DREOX, Eq., F. R. S., London, Eng., to Theosist Suringard, Eq., Vice President Dominion Telegraph Compuny of Canada, on the progress of the Parkite Light in England, beautied to, and printed by request of The Private Bills Committee, House of Communs, Oranya, 10th March 1885.

"The Electric Light during the past two years has mode wenderful and rapid strides, and England has now really put herself in the van of progress in this respect.

13-11

Top. Ass. Lister Systems. The Illimination of Streets by means of the Electro-light was begun in Paris, but the length of streets so lighted up, has not mercased since 1878. In Figural, however, about six unles of streets in the city of London are regularly illiminated in this way. In one case, the works at which the electricity is generated, are situated at Lambeth, over one onle from the city, and forty lamps are maintained in action over a circuit of more than two miles in length. This is the limb system. The large spaces in treat of the Guildhall; the Manson House; the Royal Exchange; and London's street, are aluminated by magnificent lamps on the Siemens system, and the read from Landon leader to the Mansion House, is also illuminated by smaller Lungs of that celebrated term. Oncen Victoria street from the Mansion House to Blacktrary Bridge, whehted up by the Electric Light and Power Generating Company; but this has been the least sweesful of the esperiments made. The most striking Are system is that of Siemens. The Brush light is expensive in its first cost, and it processes a wavering and an imsteadiness which is extremely irritating to the eyes of passers by. At Talinlough it was considered such a failure that an order was given for its removal, and it had to be carried out. (It failed from the gross ignorance with which the ways were curred.) The British Elector Light Company attempted to light up a portion of laverpool, but from some cause or other, of which I am interant, it was a fadire There is, however, no doubt whatever that the practical sists and translated of the Flextre Light for the disministration of streets and of large areas, have been incontestibly proved by the experiments in

RATION SATION, A great many Ratheay Sations have also here discontinuated, in fact disc below for large large mixed in the collar below for stress on the satisfactory through the control Vermin Ratheay; Herryod North Station, of the control Vermin Ratheay; Herryod North Station, of the control Research Satisfactory through the control Ratheay and the large l

155.85. Several Dicks have been illuminated, totalily the new Albert Dicks on the Thannes, where the Quays of nearly two miles in length are illuminated as if by daylight, while the portable apparatus is used to convey the highly into the Shods, and even on board the Ships.

MARINE PARATES. Two or three Marine Parades have been illuminated most successfully. At Illackpool, in Lancashire, several of Siemen's magnificent lamps light up the Grand Parade in that town and the sea in the immediate

neighborhood. At Brighton, experiments have been made in this direction, and the authorities contemplate lighting up the Parade.

Limitablewise. For Light horse purposes the Herris Light has been a proposal reason for more than twenty years, and onling to the recent advance in the character of machines and in the stratures and quality of the lamps, the Trumy House Bretheria are extending the system, and two or three new lighthouses are leave fixed up with the Exter Light.

For Colyne, M. event on the Fost Fost on this country we have represented with Gartie Light in Delegan oil selving princes. For Folyapph and Instrument Room and Sering time, at Olyne Instrugerynamidal Boundard The Assessment of the Colyne Instrugation of the Colyne Instrument of the Colyne Instrument. The Assessment is the terrelative to the temporary to Lamp. The Security Oline at Inhibition, the distribution associated underlying the Instrument of the Colyne Instrument of the Colyne Instrument of the Instrument and the Instrument of the Instrument of the Colyne Instrument of the Colyne Instrument of the Instrum

It will be seen from the above remarks that most of the experiments that we been tried and the detail time, this has balanche been much never been remote from with Art. Lamps, the the coads of the experiments and the besons branch by Brans, show remote about the experiments and the besons branch by Brans, show remote about the experiments and those speech and that it is mercal proposes, the other work and household purposes, there only be a superior with their visiting and household purposes, there only it is experimentally that we that the system.

by in andersone is that which will executely supplant (is:
The Secventee'es Hoart Section: Here are two or three houses in
which this light is in terit in Fighand of the speciments from houses in
Grossyne Place, and at this country reschence at Secure (doken laws) for
Americans, norr Novacoke, and at Sec Wir. Tomorous's at Grogor. 1

lope shortly to light up my own hoses by the bis index with Light. There are four systems of linearless out Light not on truth. The Strain, The Lince Ferg Lie Maxing, and the Libons. There examined thread lists, very gent one, and I have come to the conductor that by far the less in all its details to that of Mr. Eilmon, in the, lises symmetric filled they desired,

Deltar, The Occasion of the Section of the Index market at the Cycuit Falce. The Occasion of the Section of the Index market devery slight the Upset Fermidel, and has new with ording but the highest speeded. A Great has been excluded on the Index speeded, and the Index Section of the Index speeded and the Index speeded and Index speed

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GANALA REMAYER. The price of the in English or many place we deep that in Security points to be get the firm as recornical parties of years that the same point of years, the Electric Light will supplied like, but there is no doubt of the figure to be included as the charged in the case of the control of t

to the contraction of the contra

using pattern frames grow the Llouin, Light, know ofly that it gives a given and welfer light, but that it means to the throughout a give a given and welfer light, but that it means to the throughout the gives which varies by and although the Tatum Light welfer a gent work to the state of the save light as a sufficient to the Automateria for the save with the Automateria for a given and the Steep and the left downship is for the save with the Automateria for a given and the Steep and the left downship is soon to be that it makes the base too old. I think, however, that there expresses of given in markey district, seek to make the given as markey fairs, the to make the light grant own, although the are savely 14 feb.. There is not doubt that where Given we old, the imagentation which may be given a given given given the given giv

Althochage Destric Liche Companion have applied to Parliament this para for little to give them power to reper storest and to by and superior their stores, and there is no doubt that all three little will be referred to a Settle Committee and that probably power will be great more to arrange with lexal Ladies, such as Corporation of Towns and Banals of Health, for the treaking up of streats and the superiors of wires.

W. II. PREECE."

LONDON, February 6th, 1882.

TENTH BULLETIN.

The Edison Electric Light Company

65 FIFTH AVENUE

(These bulletins, originally issued as a consensut in systam corrise, the longities of distant agents, are use, in response to innersus repress, cent above vall stockbullets, to give them information of the progress of the tompusy and of other natures of greater or less interest conserved with elvins legisline. Agents are particularly response to communicate to the "Net Problems witherer per action points or general interest may be devolved by their experience in its diling or operating our highly.

New York, June 5th, 1882.

PROORESS MADE IN THE FIRST DISTRICT, NEW YORK
GITY. The last blideen beought the work in the First District
town to the multide of May. "mar these additional measestion
safety-actic boxes have been put in, and there his been saidleave
progress in being the remaining, additionation conductors. The
central station building on Paul Street his been counted with
the nains, and foelesser running change due street in from it of the
details of the plant in the building test far he her morely completed, and a composed to take charge of the builders and the engines. A full a count of the progress undel
during the mouth of May will be published in the next number of
the Buildini, and soon after we hope to be able to amount, that
we are early to start he light in the First District.

MILAN, ITALY. Two steam dynamos, similar to those in the Pearl Street Station in this city, have been ordered for a central PLANT AT MCKEESPORT, PA. The McKeesport Timer, May 9th, contains the following account of the Edwon isolated plant, burning in the works of the National Tube Company:

"The leavy of the lamps, in or obj in the nature of cosmop, that a relief abover, of the rain of thinger from the New were shown thought coupling dynamism, where the lights were learning, and to sell the contract to a question, such a clear that a place where the contract to a question, and to the contract to a question, such. "With the richit he had an normalized of Saving my care or whethers. Instead, and the from these whether and an another than the contract to a question, and is sufficient to the contract to the con

BUDA PESTH, HUNGARY. The Post Office in that city is now being successfully lighted with a small Edison plant, superseding the arc light.

HAVANA, GUBA. The Edition plant now illuminating the Louver is giving entire satisfaction. La Noon, one of the daily space, into issue of May 15th, 1960 of the sharing of the light as follows: "Last night the Cale of 'P.J. Louver' was illuminated with electric light. The result could not have been more statisfactory and public opinion has shown its appreciation of the new light by an qualified praise." El Diario de la Marine, mother daily, said: "The exhibition has night of folious's Electric Light in the cut "El Louver," as well as of the central station, was a brilliant success. In both places a great event moved moved to and for eager to contemplate this

progress of science, which for the first time was exhibited to our public in such adminable perfection. The light is very clear and pleasant to the ega and developes of the light in the feldes can be held in the hand for a long while without experiencing any lumnor generation. The lamps in the Lower tennaned Is until after midnight without the slightest interruption or the slightest infroncial accident. The final could but they leave more stiffsched, and we have the slightest interruption or the slightest infroncial accident. Their discould not the low more stiffsched, and

NAMES OF OUR DYNAMOS. The Edison Machine Works is making six sizes of dynamos. We got below the capacity and the control of the several machines. Our agents will phase be careful hereafter to designate the machines by their correct names.

It should be understood that the rapicity as above given is for A or 16-candle lights, and that in each instance the dynamo will generate current for double the number of B or 8-candie lights.

WEED, PARSONS & CO. A plant of 120 B hamps, to be run by a Z dynamo, is being installed in the punting house of Messrs. Weed, Parsons & Co., Albany, N. Y.

RECENT ENDORSEMENT FROM THURBER'S. The following is an extract from a recent letter written by Messes. II. R. & F. B. Thurher & Ca., New York City, to business french in another city who were thinking of introducing the Edison Light and who wished to know what Messey. Thurber & Company thought of it.

The estimation in which they hold the light is shown by the following extract from their letter:

"We take great pleasure in recommending the Editon system of lightness. We have now in one root organism machine, for light reach, in our setting, at Enrile, West Brancha, ye Uniform Su. We have not adopted the system at Enrile, West Brancha, ye Uniform Su. We have not adopted the system of the most economical and satisfactory system of lighting we have ever seen, and as not also the form of the state of

H. K. & F. B. THURBER & Co."

INJURIES FROM GAS JETS. The Scientific American, May (3th, 1882, contains the following article on "Some of the Beneficial Effects of Electric Lighting":

"An English writer, after describing the baneful effects of gas lamps upon the healthfulness of living mours, goes on to notice some of the mischief done to looks, wares, furniture, and the like. The evil effects of the heat of gas jets is augmented, he says, by the large amount of water produced by the gas flame. Sixty larners will produce on the lowest computation two gallons of water our least; hence in a November evening many large shows filled with delicate roads will have a none gallon cask full of water thrown into their almosphere in the form of steam, to condense on any cool surking, as we often see it trickling down the windows in winter. But worse remains behind. The sulplant, always present in gas in larger or smaller proportion, according to the character of the coal employed, burns into sulphurous supor, which passes in the air to the state of oil of vitriol. The eminent chemist, 18r. Front, exposed water in a drawing room in which gas was burnt, and found that it absorbed sufficient of these vitrfolic constitutions to redden blue littmrs and show the presence of free subduric acid. The funes from eas will indeed, in the long run, discolor every sort of labric, rust metals, rot gutta percha, and reduce leather (as in the bindings of books) to "a scarcely soberent nowder with a strongly acid taste." After referring to the reidence of the librarians of the Athenron Clab, London Institution, etc., as to the rotting of the bindings of books kept in rooms lighted by gas, the writer says: Drapers know to their cost how the edges of pieces of dyed fabrics become faded and rotten when kent long on the upper shelves of gas lighted shops; no plant will grow in a room where gas is burning, and cut thowers quickly wither; while those who work long and habitually in gas-lighted rooms become blanched and sickly. From all these manifold crils electricity will deliver us.

AERIAL CONDUCTORS VETOED IN CHICAGO. Mayor Harrison, Chicago, sent a veto message to the City Conneil, May

8th, vetoing an ordinance passed May 1st, allowing electric wires to be run on proles. The Mayor thinks the wires should be placed underground. The veto of the Mayor was subsequently unanimousby susvained by the Council.

BRUSSELS, BELOIUM. An Edison isolated plant of 120 B lights is now being installed in the Musée et Passage du Nord. The installation is part of the Museum and is in a new stone building erected on one of the principal streets of the city.

THE WESTERN EDISON LIGHT COMPANY, CHICAGO. In a future issue we will give full details of the organization of the new Edison Company in Chicago. The Chicago Tribum, May 28th, contains the following notice:

"The Western Edison Light Company completed its organization yesterday, and the indications are that the incambes out light of the Libson system will som come into general use in Chicago and the West. This light is adapted to the lighting of houses, and is distributed and used through fixtures resembling the ordinary gas fixture. It has not the pallor of the large electric lights used in the streets, but is of an agreeable color. The Directors of the company are Thomas A. Edison, of Menlo Park: Gen. Anson Stager, John B. Drake, J. W. Dome, Norman Williams, Edson Keith, John M. Clark, John Crerar, and A. F. Seelerger, of Chicago: ex-Gov. Samuel Merrill, of Iowa: and Z. G. Simmore, of Wisconsin, President of the Northwestern Triegraph Company, and among those interested in the company, it is said, are a mon prominent capitalists, including George M. Pullman, Marshall Field, Samuel Allerton, C. R. Commings, and others. The operations of the compuny are not contined to Chicago, as it owns the exclusive use of the patents of Mr. Edison in all cities in the State of Illinois, Wisconsin, and Josea. The company has rented the stores Nos. 51 and 53 Wahash asenue for its headquarters, and will immediately set up a plant there capable of lighting nearly the entire block. Already it has placed its lights in Marshall Field & Co's basement, retail salesroom, the Palmer House, the Republic Life building, and its wires are in several residence houses."

KING PHILIP MILL, FALL RIVER. We have received an order from the King Philip Mill, Fall River, to install an Edison

plant of 702 A lamps to light the new mill, the plant to be installed by the time the mill is finished, and to be in running onler September (5th.

PRODUESS IN ORRAT BRITAIN. The London Company is now in good working order, and local companies are being traisily established, especially in England. Many orders have been received for plants, and they are being installed as rapidly as machinery can be promised in bacid organizations can do the work. My Johnson last promised us a list of all the plants thus for actually running, for an early number of the Indiction. The Hollown Valudar Sciental Station continues to run with entire suifscation, and is generally recognized as a successful exhibition on a large scale of the practiced working of the Edision system of incundescent lighting, both in Isomes and

SMALL PLANT IN NEW YORK CITY. We are installing a small plant of 15 lights in the preserving establishment of Max Ams, 172 Greenwich Street, New York City.

THE ELECTRIC LIOHT CURES SHORT-SIGHTENDESS.
The Landon Engineering, February 15th, 882; refer to an article contributed by Prof. W. H. Pickerine, Massochuseus Institute of Technology, Boston, to the Jondon Absure February 19th, 883; emitted "Concerning the Gre Fibruary 19th, 1882, and their Effects on the Eye," The following extract is from the article in the Engineering:

"Semarking the unmber of students who are afficient with short sightedness, prodecore fischering has battery extantion! own physical causes that pairing about this abnormal condition of the eye. He finds that it is not the light so much as the heat that it mainly concerned in elect-poing the prejuitcial effects. Heat is radiated from the flame of the lamp and chainery, and is reflected from the slade and the surface of the pairy. It insmediately alters the hygrometic conditions of the sorrounding air and dries the forehead, temptes and eyes. This view seems to be confirmed by the fact that temporary relief from headache and pairs in the eyes may be found in bathing the affected organs with firsh water.

Goldsay gas harness and oil lumps give out a considerable amount of head by the request constraint of the hybracterisms and hence their highhous effect. In this respect the return light is not seen to the same dispersion of a history, the truty of rendered as home as desardle, still there is but very little hear poslured. The skering with its operability sideled when he are is employed, it extensibly a draw-load, but this, it is loyed, will be ultimately remised. Almost prefer studiess is a fairly statistical in the cased-seen little and the contraction of the contraction of the contraction of the contraction of the contraction.

ANTWERP, BELGUM. An Edison isolated plant of 45 A and 40 B lumps is now running in the Sugar Reinery of Gin, Segers and Co., the largest of its kind in Belgium. The plant runs from stanight mutil six in the morning. It has given goot satisfactions and in consequence the firm desires another factor; biguted with about 30 lights.

THE ORANGE WOOLEN MILL PLANT. Our lights have now shown in the Cornege Woolen Mill. Newburgh, since last September. Mr. Harrison, the proprietor, memors as that some of his langs have been burning over 1,000 bours, actual burning, and are still attice. He list highly bested with the plant, and states that the dynamo gives him as little trouble as only nucleine in his milt.

OAUBES OF FIRE. A number of the leading insurance companies of London have been trying to discover the causes of tires which occur in dwellings. The Firemar's fournal says: "It is estimated that twenty her cent of such fires in cities are the result of gas or other light coming into contact with curtains or window blinds."

EDISON'S STEAM DYNAMO. Mr. C. L. Dean, Superintendent of the Edison Machine Works, under whose charge the Edison

dynamos are built, furnishes the following items of the weight of the entire stam dynamo and of the principal purse of it. Attached to the each dynamo and mounted on the same heal plate, we that it forms an integral part of the steam dynamo, is a steam energies of 125 II. P. Each of theses P. and expalse of being driven up to 200 II. P. Each of these dynamos has afresdy developed, by a scand set, 1250 lamps of 16, 150 candle power. The total weight of each dynamos is 66,336 has a and the veiction of the different nears of the dynamos is 66,336 has

Bed Plates					10, 337	11:5.
Zinc Bases					677	••
Fields -					16,372	••
Cores -					6,044	••
Keepers -		-			6,300	
Pillow Blocks	-				671	••
R. Arm				-	125	
Armature					13,710	
Engine -		*	-		6,500	••
					60,336	Ilrs.

WORUMBO COMPANY. We have received an order to install a plant in one of the mills of the Worumbo Manufacturing Company, Lishon Falls, Matine. The installation will be made at once.

UNDERGROUND CONDUCTORS. The report of the Sub-Counities of the Countilities on Cities of the New York State Senate, relative to anderground conductors, together with the testimony taken by the Committee, has been published by the Legislature under date of May 3rd, 1882. The following extracts are taken from the renort.

o'The important question to which your committee have directed their impairles, is the practical-tilty or rather the feasibility of placing all electric wires underground. They fully recognize the importance of preserving to all

the companies the full measure of their usefulness, and of not imposing upon any of them unreasonable burdens. They have kept in mind the immediate and future breaking up the surface of the succes, an evil not so serious when we consider that as many as 800 wires can be placed and worked in an 8 inch take, the question of the practical and continuous working of subterranean wires, as well as their relative cost, value and convenience to their owners, as well as the public, and they believe that they have considered and weighed all the elements of the impury necessary to a safe and intelligent conclusion, In this investigation they have examined more than twenty somesses, most of them experts in the use and application of electricity - some of them certainly the most thorough and accomplished experts in the country. These gentlemen represent the apponents as well as the friends of the proposed bill. One was the electrician of the Western Union Company, others were connected with other companies, and the committee insited by public automorphism and private invitation all who could aid the inquiry to present themselves for examination. The testimony of these witnesses is herewith presented. In the opinion of your committee, it establishes, beyond controversey, the entire teasibility of subterranean wires, for telegraphic, telephonic and electric light purposes, and shows it to be the duty of the present Legislature, so far as our larger cities are concerned, to provide by law for the prompt commencement of the work of jutting these wires molerground, and for insuring the removal of the posts and wires from the streets of such cities within the next two wears and six months. It is a noteworthy (ac), that among all the experts examined in the city of New York, there was not one who could testify unreservedly against the feasibility of subterraneau lines at the present time. * * * The committee recommend that the growth of the evil is promptly and definitely arrested, and the construction of new lines or the ejection of posts in any of the streets to which the bill applies, be declared so clearly unlawful as to justify their destruction by any individual who may choose to remove them. They also recommend that the corporations be required to remove all the posts, or other fatures from all the streets, avenues and highways in such caties, within two years and a half, a length of time which the committee believe to be analy sufficient for the change.

BEBLIN, OERMANY. A central station, modelled on the Holborn Viraduct Station, London, is being installed on the Uniter den Linden, Berlin: They will use two of the Kidson manmoth steam dynamos, similar to those used in our Pearl Street station in this

PUBLIC LEDGER, PHILADELPHIA. The plant just installed in the office of the Public Ledger, Philadelphia, is giving good

satisfaction. The following extracts are from the issue of that paper, May 18th:

"On Tue-day and Wednesday nights the composing from of the Postac LEFTER office was lighted by means of the Felison incandescent light, which proved a very satisfactory substitute for gas, both on account of its illumina ting power and of its agreeable character as compared with gas, in that the incandescent light does not heat or vitiate the atmosphere. The electric light is furnished by what is known as a 60-light dynamo machine exected in the press room. The runducting wires, heavily insulated, are from the basement to the fifth story in the grooves of a flat board fastened to the wall, the grooms being covered by a lid screwed on after the wires have been put in place. On the main and all branch circuits are "safety catches," rousisting of lead wire interposed in the circuit; the design being that if from any cause the current becomes too strong and threatens to heat the conducting wires, the lead wires shall be melted and the connection broken, thus removing all danger. The wires are carried overhead on several circuits above the compositors' stands, and down through gas pape "drops" to swinging brackets, very similar to ordinary gas features, but terminating in a serry socket, in which the lamp is to be fastened. The fixtures, are in all respects the equivalents of gas fixtures, and the light is turned on and off from each lamp as with the gas by means of a simple key. The lamps used are of two sizes, one rated at 16 canelle power, the other at 8 canelles . . . There are sixty-five lamps of sixtern catalle power in the composing 1000 and streedyping foundry, and sixteen of eight-catalle power, besides one of sixteen catalle power in the press. toom, making a total equivalent of seventy four of sixtern-candle power. though the dynamo machine is rated as a sixty light machine, it fornished a satisfactory light from all these Limps on Tue-day evening, and there was still some reserve power, a part of the esistance cold being in circuit. The lamps are hung with the bulb downwards, or that there is nothing to hinder the light from falling directly on the compositors' cases. They have over them white gless shades, like those of argand burners, which greatly help the light by concentrating it. The trial so far has been entirely satisfactory, so far as the electrical features of the light are concerned. It is too early yet to speak of the economy of the system. That will depend to a greater or less extent on the lifetime of the lanus."

LIGHTING STEAMERS IN RUSSIA. A fina of Russian incrchains who have a fleet of steamers plying on the river Volga during the summer, are having one of their vessels fitted up with 110 Edison S canalle lights. If this experiment prove satisfactory, the light will be introduced on the whole fleet.

E. & T. FAIRBANKS & CO. We are invalling a plant of one Z dynamo, 65 A lamps, in the scale works of E. & T. Fairbanks & Co., St. Johnsdury, Vt.

VINA DEL MAB, OHILI. We have received a letter from Mr. Lawrence, the engineer in charge of our soluted plant at Vina del Mar, informing us of the continued success of that plant. The letter states that everything appertaning to the machine and lights has worked well and given enure satisfaction from the start. There are 58 lights in the houst. A supplied by 3750 feet of conductors, benifies 2 A and 4B lights run over 1320 feet of conductors in the house of Mr. Kendell, some distance avay.

MILWAUKEE, WISCONSIN. A small plant has been ordered from the Isolated Company for the store of Mr. John Hinkle, Milwaukee, Wisconsin, and is now being installed.

RAILWAY STATION LIGHTED AT RIO. We lave received a report, dated Jaly 4th, about our plant harming in the Dom Petilo Railroad Station, Rio is de Janein, Brazil, stating that the lights up to that time had been harming 78 days, aggregating 338 hours, with a boas of only secent hatps. The lights are arranged a schlows; 6 at the entrance of the station, 8 in the Waitine Room, 5 in the Brazillon of Room, 1 in the Lights Waiting Room, 5; in the State of depost proper, and 2 in the engine room, making a total of 60. The Countristion appointed by the Government less examined the light and unade an official report, showing a result much better than we had represented.

PALMER HOUSE, CHICAGO. Our plant continues to run well in this hotel, and the proprietors say nothing better could be desired. In the large dining room we have 60 lumps placed on the gas fixtures by special attachments, and in the small dining room there are 36 lamps placed in the same way.

THE ENGLISH PRESS AND MR. EDISON. The present artitude of the English press towards the Edison light is very gratifying. English journals of all kinds are filled with long accounts of the success of our light at the Crystal Palace and of the starting of the Holborn Viaduct Station in London. The very papers that used to ask, "Why does not Edison do something?", are now themselves farmishing the answer to their own question, namely, that he always has been doing something, and that, instead of going before the public with a fragmentary invention, as other inventors have done, he has been patiently and thoroughly developing an elaborate System of electric lighting. That system is now in practical operation in London at the Holliotu Viaduci, and the mamonous tribute paid to its success by the British piess is the best possible apology for the ignorance heretofore displayed in the oft-written taunt that it was "time Edison was doing something." A recent letter from a prominent electricism of the English Edison Light Company, speaks as follows of the present attitude of the British press:

"Not many souths ago Dilvon was being rishested and unered at by unceleaths of the technical and daily press, but noday there is not a pager in all Bingland of any out or character, which does not apartly almit that Elisombas proves by his work bere that all his posmics have lever fuffilled, and that he is for and oway in obstance of all competitors. Use than a year ago noses were so poor as to do him reterrence, while term more are too higher too rich."

ELEVENTH RULLETIN

The Edison Electric Light Company,

65 FIFTH AVENUE.

These bulletin, neighbully issued as a consistent way of amounting the legisles of distant agent, are me, in respect to immerious regises, vent also a sail stock, holders, to agive them information of the process of the Company and of other matters of greater re less interest constructed with schedic lightines. Agents are particularly requested to communicate to the Vice Precident wheteer granted approached by communicate to the Vice Precident wheteer granted approached and processing our developed by their exceptions in installing or spreading our legislates of any lie the developed by their exceptions in installing or spreading our legislates of may be a few-field processing our legislates of any lie of the original processing our legislates of may be a few-field processing our legislates of may be a few-field processing our legislates of may be a few field of the processing our legislates of may be a few field of the processing our legislates our le

New York, Jone 27th, 1882.

OFFICE TO BE CLOSED EVENINGS ONE WEEK. The office of the Company, No. 45 Fifth Avenne, will be closed evenings during Fourth of July week. Our agents will please hear this in mind in making appointments to be kept at this office during that week

PROORESS IN THE PIRGT DISTRIOT, NEW YORK CITY. The Nimb Indictin contained a detailed account of progress made up to the end of April. During the month of May, 793 feet of street undergound conductors were lidd, including, mains on the block frome, street intersections, Indige intersections, and feeders. In May there were 2x working days. Most of this time was spent in putting in slighty-suchs haves and street intersections, forty-stells baces. The c were 37 of them laid in 20 days. Three days were altoted to putting in mains and feeders upon the idock frome, and at intersection, and one day was given entirely to heighes with

r.

their safety-catch hores, a class of work which was also continued from time to time in connection with the other undergoard conductors. Fifteen house connections were made between the conductors in the streets and houses already wired for our light. During this monthal the remaining interaction howes have been put in, and all the street mains have now been had except at Fulton Market, which which exception, and with the exception of a 6w bridges, the work of Liysing the underground conductors is now entirely com-

PHILADELPHIA. THE LEDGER PLANT. The light in the ledger building has proved so satisfactory that a larger plant has been ordered. Pending the change to the new plant, the light was temporarily stopped, but the compositors, when thus obliged to return temporarily to the new of gas, went a committee to Mr. Chalds causesting that the Edison light the restored as some as possible.

WIRINO OF THE MILLS BUILDING, NEW YORK CITY.
The Mills Indiaing, Wall and Indoo Street, has been wired for 5,588 Edition lumps. As this is the largest enceptive of the kind occur anderstuck, and he details may now interesting. The conductors consist of 1,650 feet of Edition's patent electric tultses, 568 feet of Indiaple; constraining taped wise throughly instanted, 23,658 feet of Fine tubes, 75,509 feet of wire conductors, and 22,162 feet of wooden receptacles, placed between the floors, to hold the system of distributed wires. The total amount of wire need was 3,754 lbs, besides 48 vertical main cut-outs, and 23,5 division cut-outs. The work was done by the wiring elepartures of the Edition Hillmitasting Conquany of New York, under contract with Mr. D. O. Mills, the owner of the building.

BOLOGNA, ITALY. The installation of a plant has just been completed in the flour mill of M. Pastico Cavallère.

EDISON LAMP COMPANY. NEW FACTORY. The moving of the lamp factory from Meulo Park to East Newark affords a fitting occasion for making a brief mention of the history of the Edison Lamp Company. The manufacture of lamps was commenced at Menlo Park, in November, 1889. Prior to that date, a large number of lamps had been made, but the first regular pay roll of the Lamp Company, as an organization distinct from the laboratory and the experimental department of the Light Company, was November 11th, 1880, which may be taken as the date of the starting of the factory. From that time until April 184, 1882, when moving to Newark was commenced, the factory was running all the time, except about six weeks. The largest number of men employed at any one time was 135, and for the last year there has not been at any time less than 1 to hands employed. Up to April 1st, \$2.00 hamps were shapped, and at that time there were about 50,000 misold in stock. The reason for moving the factory to East Newark, is to secure larger buildings, with increased facilities, also convenient accommodation for workmen, and to be nearer the source of supply for obtaining reliable help. The manufacturing of lamps was begun in the new factory at East. Newark on the first of June, 1882, and 150 men are now employed. The tools and power now in the factory are adequate for making 1,200 lamps a day, but the factory has an ultimate capacity of 40,000 lamps a day, which will require from 3,660 to 4,000 hands, according to the style of lumps made. The lamp factory has always been managed with unusual skill and intelligence, and all visitors have united in praising the perfection of the system and the economy and precision of the work. The Officers of the Edison Lamp Company are as follows, viz: Thomas A.

Edison, President: Francis R. Upton, Tressurer; William Holzer, Superintendent; and J. J. Bradley, Master Mechanic,

ITALY. ADDITIONAL PLANTS INSTALLED. A plant is now being installed for Monsieur Cressi. Director of the National Rank, in Milan, in a factory near Milan. Another plant is being introduced in the cotton spinning mill of M. Punti, also near Milan.

CORNWALL, P.A. Mr. R. H. Celeman is now using one of our isolated plants at his authoritie finance. The plant consists of one 2 dynamo and 60 lamps, and the light is used in the smelling and engine toons, also in the office which is situated nearly 500 feet distant from the dynamo.

PHILADELPHIA. THE STETSON PLANT ENDORSED.

We received the tollowing lener from Messrs. John IS, Stetson
and Co., Hat Manufettures, expressing their satisfaction with the
Edison isolated plant now in use in their factory, No. 1,746 North
Fourth Street, Philadelphia;

"Paulanteuma, June 21st, 1882.
"To the Empoy Company for Isolated Learness:

the atower to your toppiny of today, we would say that we are entirely added with the Elicon light, and in regard to the half lights in our swing department we causant speak no highly of them. We are might them on black work movely. The operators are especially pleased with the absence of feet and highering.

"Very respectfully yours,
"Jours II. Stresson & Co."

MR. JEHL ON THE EDISON METER. Mr. Francis Jehl, formerly connected with Mr. Edison at Menlo Park, lass published in London, for the benefit of the Edison Company in London, with which Mr. Jehl is temporarily connected, an interesting pamphdet on the Edison Electric Meter. Any stockholder especially desiring a copy can secure one by addressing Mr. Francis Jehl, The Edison Electric Light Company, Limited, 57 (follown Viaduct, London, England.

HAVANA. THE LOUVRE PLANT. The Edison plant illuminating the Louvre continues to create a marked sensation. There are 58 A lamps on 17 chandeliers and 8 It lamps on one chandelier. also 4 B side lights connected in series, making a total equivalent to 64 A lamps. The Edison lamps are arranged on the gas chandeliers so that gas and the electric light can be used either separately or together. Hy simultaneously shutting off the gas and putting on the electric lights, an effect is produced which is highly appreciated by the patrons of the Louvre. The current, generated in a building 500 feet distant, is conveyed by underground conductors consisting of size No. 4 Edison Electric Tubes, Izid 15 inches under the surface of the ground. In addition to the illumination at the Louvre, a display of 60 lamps is made at the office of the Edison company, where are also displayed hand lamps, bracket lamps and a large outdoor globe containing to lamps, also a motor (% H. P.) driving a sewing machine. The entire plant is driven by an 8 x 15 automatic cut-off engine, running 150 revolutions per annute with 60 lbs. boiler pressure and an average steam pressure on piston of

BUDA-PEBTH, HUNGARY. The General Telegraph Office is now lighted with a plant of 60 A lights. There are six lamps in the public office, a few on the staircase, and the rest are in the large telegraph operating room.

ABLINGTON MILLS, LAWRENCE, MASS. With reference to our plant running in the Arthugton Mills, Mr. Hartshorn, the Superintendent of the mills, states that the quality of the Edison light "is undoubtedly superior to the ges light either past or present."

He further writes that the dynamics have worked well, with no greater consumption of power than was guaranteed, and that he has never had occasion to stop them while in use, from any cause whitever. He able that the company are "much pleased with the prostance of the light and are satisfied with its performance."

BERLIN OLUBS TO BE LIGHTED. Plants have been ordered for two Berlin Clubs, namely, In Ressource and l'Union.

ANTWERP, BELGIUM. A plant of 60 lamps has been installed in the Hotel de Ville.

SARREQUEMINES, LORRAINE. A plant of 60 A Lights has recently less started in the feture of the Porcelain Manufacturing Company, the largest of its kind in the world, employing 2,500 hands. One fact of expectal interest in connection with this plant is, that 20 Edison lights are used in the planting room, where the procelain is decorated, thereby enabling the decorateds between artificial forms.

LONDON. BPECULATION IN LIGHT STOCKS. The London papers continue to refer to the great speciation enging in that city in stocks of electric light companies. It is a source of gratification to use them of that rosts of the practical Edition company, in London, is on the market, the entire stock having been taken by a limited number of large, explicitles, who will hold it insteat until the system shall laive been thoroughly exploited and its financial success assured. In Ladouchers, in a naricle in Traval, May 12th, that commenting in very secre terms upon the questionable methods adopted by certain light companies to frost their stock upon the London market, makes an exception with reference to the antecedents of Mr. Editon, of whom he market, as follows:

BOSTON. VENDOME HOTEL. We are installing a plant of 60 lights in this hotel. About 50 lights will be distributed in the dining room and about 10 additional lights in the objects.

NUMBER OF LARPS IN BOLATED PLANTS IN THE UNITED STATES. The Instincts of the Island Company amounts thus for to by isolated plants, aggregating 19.212 langs, and 5.30 B langs, and fine the following the same of langs in the following the same of the sa

STEYER, AUSTRIA. An installation of 45 Å and 32 B lamps has just been made in the machine slups of the Oesterichische Waffenfahrik Gesellschaft. Our dynamo is run by water power, and the plant is giving great satisfaction.

JERSEY CITY. We have just lighted the sugar refinery of Messrs Mattheissen & Weichers with two Z dynamos and 300 II lamps. This firm had tried several systems of lighting by electricity, but none had proved satisfactors until ours.

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MILAN, ITALY. The following is a translation of a letter addressed to Mr. Shepherd, connected with the Edison light in Italy, relating to the successful introduction of the light in Milan:

(TRANSLATION.)

"Mil.an, March 28th, 1882.

ојаме Sпетиско, Езр. оМилах.

"The expression of disturbles on their highling fillings system; arrived by you for early and pilot in the largest Proy of the Nath Therine, succeeded in a numer or simple in the largest Proy of the Nath Therine, succeeded in a numer or window; and the early of aciding at these most succeeded exprising to prove the size of the enterties of the

"With all esteem,
"The Mayor of the City of Milen,
"IDELINEAGHT"

THE THURBER PLANT AGAIN. The following letter from H. K. & F. B. Thurber & Co. speaks for itself:

"New York, May 27th, 1882.

"THE EDNOS CO. FOR ISOLATED LIGHTING,

"New York.

"Generatests :=Now that the installation of your light in our building has been completel, we take pleasure in informing you that the light as now used gives us entire satisfaction. We find that it can be readily controlled by our engineer and, in short, that so far as our experience goes, it seems to meet all the requirements which you claimed for it.

"Yours very truly,
"H. K. & F. B. THYRDER & Co."

CHICAGO. PLANT IN THE NATIONAL LIFE BUILDING. A plant of 60 lights was started May (8th, in the National Life building. Many lamps are used during the day, and the tenantexpress themselves as delighted with the light.

STEAMSHIP QUEEN OF THE PACIFIC. This new steamship, belonging to the Oregon Railway and Navigation Company, is lighted throughout with the Edison light, except the hold and pilot house. There are in all 246 B lamps, of which 12 are of 16 candle power, and the balance of 8 candle power. There are 2 Z dynamos driven be direct belt connection with the engine. The lamps are so arranged that any individual lamp or section of lamps may be lighted or extinguished at pleasure, all switches being placed under control of the steward. One switch controls all lamps torward of the engine room, another all the lamps in the steerage, and the balance are divided among the staterooms, offices, engine room, saloon, done, shaft alley, &c. The wires are all carefully concealed from view, and yet are easily gotten at for the purposes of repurs and addition. On the trial trip every lamp came up perfectly, and entire satisfaction was expressed by all. The following description of this installation is taken from a recent number of the Nantival Gazette

"The Queen of the Pacific is lighted throughout by the Edison Electric Light system, and she is the most perfectly lighted of any vessel in the world, there being about 250 electric lights distributed through the ship, with connecform for placing lights on the wharves at her loading and discharging parts on her route. These lamps are served into a sacket in the ceiling of each statersom, water closes, the butcher's shop, mess room, engine and builty rooms, shaft alley, all the officers' rooms, crew's quarters storage, calley, pantry, passage way, 'glory liole,' cir. These lights are scarranged in ground that the steward can turn off the lights in the state rooms, the salrons, in the dome, or in fact, any section of his department at will, or can turn on or off any individual light. In the officers' rooms, or the engine department, each light is manipulated at will or as a whole as desked. There is absolutely no danger from heat, fire or explosion in this system. 'The "safety-catch" precludes the possibility of fire. For lighting steam vessels this light is cheaper, cleantier and safer than any other means of illumination. The steamer Columbia of this line was fitted with the Edison light in 1879, and the success of the system has been very marked. She had 115 lamps in circuit in Pebrucontract the second sec

any law, not they final becomes nor right pures, without errors nor language on, the express length of the 13 Junys, with out at \$6 per to on, only 18 cents per haur. The Gity of Herman, of the N. V. x. Normach Line, is already with the similar with the Island line). The (town of the Principle has two deposits and the principle line). The (town of the Principle has two deposits and by an of these power lenshifted region, while the arrange more in light the resolution of the principle line in the machinery, and it stips are the minimal regions of the first line architecture described to express the artimless active with a significant form of the principle line in the machinery, and it stips are described by the principle line in the state of the principle line in the principle line line in the principle line in the principle line in the principle

THE "INSURANCE THERS" ON THE THE QUESTION. M. English, in the last number of the New York funzame Time, sattes that he is informed by Mc. Andreson, the Chairman of the Committee on Police and Origin of Fire, of the New York Board of Fire Underwrites, which has been examining into the shapes of fing from the use of electric light equipment and has prescribed rates for wiring buildings, that the flow off Conferenties "share no record of any accident to life of property cassed by the use of electric lights where the entire copliment was in full compliance with the New York Sandard." These rules have now been in operation for six months, and the fact that there has been no fire and no accident, shows not only that electric lighting is safer than gas, but that it is well high absolutely as for

MANCHESTER, ENGLAND The following notice of the plant now running at the Salford Iron Works, is taken from the Manchester Weekly Times, May 20th:

"The follow deteric light has been spilled to practical purposes for the fort them is Mancheser in the workshops and disc via Mexes. Matter of Rath, the properties of the Salidon Innovates. Two dynams materiles of Rath, the properties of the Salidon Innovates. Two dynams materiles was been combined strength of two light bowers, to be whether the spilled power, produce an electric current for 154, lamps, each of the spilled power produce as electric current for 154, lamps, each power and the spilled power for another. The acceleration are divined a single-cyclinder drawn engine to six-horse power manhal, and the mains are carried from the natches to all

parts of the healing. In the workshops there are 80 lamps, and in the offices 54. Each lamp can be detached from its bracket and carried about the russo. care being taken that the connection with the wires is not stopped. The light given out is very weady, and greatly exceeds the ordinary gas jet in brilliancy. The workmen prefer it to gas, as the electric hamp is more rasily bundled, no smoke or hear is given off, and it can be held in any position. * * * Some of the lamps are temporarily fastened to the ordinary gas leackets, while others are affixed to a bracket which has been invented by Mr. Edison, and which allows the lamp to be mirred and twisted in any direction without the electric current being broken. The Edison montelescent lanns are distinguished from all others by their lasting power. They have been tested to stand a continuous strain of 1,000 hours, incresant burning, but if con hours be taken as the average time per annum required for lighting offices, &c., each lamp would last from our to two years. No danger from fire or accident can arese in this system. * * * The conductors may be held in the hand with impunity even while the full current is passing, * * * It is the intention of Mesers. Mather and Platt to do away with gas in the whole of their establishnorm and use only the Edison electric light. When this is done there will be over a thousand lamps in operation from the same source.

SECRETS OF OUR LIGHT SYSTEM. A prominent stockhobler has recently enquired whether any secrets of the Edison System of Lighting are known exclusively to Mr. Echson, or whether all the secrets and details of the business have been communicated by him to the company. We are somewhat surprised that such a question should be asked, as it has been repeatedly stated that Mr. Edison has turned over to the Company, not only all his inventions aml patents, but also all the details of construction and use concerning them, including what are commonly known as the secrets of the Edison System. In the case of foreign companies, notably the French Company, where everything without exception must be manufactured in France so as to conform to the French patent law requirements, not only were the leading principles of the Edison System and of the processes of manufacturing reduced to drawings and to writing, but all the details and secrets of the system were fully written out by Mr. Edison himself, and sent to Paris, so as to enable the French Company to start its manufactures and to introduce the Edison System of

lighting with the same skill and success as here. The same thing is about to be done in the case of other foreign countries. Thus at will be seen that the apprehension of our sechabolie is unfounded. We are, however, grafifed to receive the empiry, and take this occution to ask our stockholders always to ask any questions conclain the affair of the Company they may wish to. We will reply herefully,

DANGER FROM GAS. William Meakin and his wife arrived in this city on May 31st by Canard Steamer, Batavia, registered at the Eagle Hotel, Morris Street, and retired. About noon next day they were called but no answer being received the door was broken in and they were found in bed insensible. The apartment was filled with gas which was streaming from the burner. Both died within two days from the effects. * * * A guest who arrived at French's Hotel, May 21st, and registered as P. R. Covert, Providence, R. J. retired to hed late in the evening. At noon an employee of the hotel found him insensible. Medical aid was summoned but the man died at one o'clock P. M. Death was attributed to suffocation by gas. * * * Mr. C. C. Potter, clerk in the Water Registrar's Office at Fall River, was about to take the reading of the water preter at the Border City Mill No. 1, when a gas explosion occurred, whereby he was quite seriously burned. The water meter is under ground in a niche or opening. Mr. Potter took a light, and was putting his head in the niche when the explosion occurred. A subsequent examination showed that the gas from a leaky pipe had collected about the water meter. The force of the explosion was sufficient to throw some stone steps, which were near by, some 5 inches out of position, and to crack the top step. * * * The New York Times of April 27th, 1882, contains an item to the effect that John Ham, a Chinaman, blew out the gas in a room he occupied in the Van Dyke

House. He was found insensible and taken to the hospital,

Agas jet in the driving dram as of in the mirror manufactory
of Henry & Marrenner at 110 Dannes Pixer, was not entirely turned
off on the night of April 5th, and when Robert Cookson went to
light it on the following morning an explosion followed which
both burned and trained him.

CHICAGO. ADDITIONAL HOUSES TO BE WIRED. In addition to wiring the residences mentioned in the Eighth Bulletin, we are also wiring those of Thomas Dent and James R. Jones, for the Edison light.

MEABURING CANDLE POWER. The following is taken from an article on the Age of Elatricity, by W. H. Presce, F. R. S., appearing in the London magazine, Time, of May:

"This mode of indicating the illuminating power of any lamp is a subject ery lute underspeed and very much abused. The standard light with which all other lights are compared is a sperm candle, which have away 120 grains per hour. Such a standard is a very oveful unit when we wish to measure an oil temp or a gas shorner, and to measure such lights the operation is a comparatively simple one. We simply have to find at what distance the standard candle and the lamp to be measured cast equal shadows. In that case we deal with lights of the same character, emitting the same kind of rays, and we are not troubled by any interference from colour or from other causes. But when we come to use the same standard to measure the electric are, which coults rays of a totally different character to a gas lamp, we thornier in difficulties. The difficulties are so great that different observers measuring the same lamp have made it vary in light-giving power from 250 to 2,000 candles. I have proposed to alousdon the standard caudle as the unit by which the electric lights should be measured, and to take instead the amount of illumination distributed over a given area, say a square yard. This idea has not yet received adoption, though indications are given that some of our practical men are beginning to see its advantage. If, for instance, we take as a standard a square yard illuminated by a standard condle at one fest distance away, we should have a better unit to guide us than that now given by the thane of the candle. When we compare the relative intendty of different sources of light, we have not only to deal with the intensity of the light but with the volume of flam

RUSSIA. A plant of 60 A lamps has been running four months in the iron works of Nobel & Co., St. Petersburgh. A plant of 120 B lamps has been running uearly four mouths in the Life Insurance Company building, St. Petersburgh.

MI. JOINNOO REFORE FIRE PARLIAMENTANY COMMIT-TEE, LONDON. The velect Committee of the Home of Commonsappointed to consider the morits of the various electric lighting schemes permated before Parliment than Session by awe lighting companies, ges companies and corporations, have recently examined Mr. E. H. Johnson, Mr. Edmon's representative in Doulon, on the general subject of electric lighting and on the spectral adject of the Editon system of electric lighting. The following account of Mr. Ichmon's stitument before the Committee is kiden from the London

"Mr. Johnson said that the verdict of the Select Committee which had sat to consider the subject of electric lighting in 1879, was that the sublivision of the electric light was a dream. This, however, was not the fact. The conditions pre-requisite to a practical subdivision of the light, or more properly speaking, to a system of universal distribution of electricity, were the following: - Firstly, means for the manufacture of electricity on a scale commensurate with any possible consumption; secondly, means for the universabilistribution of the electric currents over every portion of a given area; thirdly, means for regulating the pressure, and otherwise absolutely controlling the force of the current; for ly, means for utilizing the current to effect the slesired work, whether for producing light, heat, or power, or for any other purpose, and whether for the production of small or great units of work; fifthly, means for protecting life and property from any danger arising from the introduction of this new form of energy into our households; sixthly, means of measuring the amount of individual consumption, so as to obtain a correct ratio of the charge to the consumer; seventialy, means for establishing the individuality of each and every milt of light ar other work, so as to render it alsolutely independent of any other unit; eighthly, means for guaranteeing on ever-present and sufficient flow of current reliable at all hours; and mutaly, co-relating to all these were such

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special general provisions in respect to every detail as would suffice to render the establishment of this new industry free from imposition upon the general public of any nuisance, either to the eye, ear, or other senses. These conditions had been established since the investigation of 1870. Flectrical generating machines were now constructed capable of developing from 100 to 130 livese power of electricity, and they formed a unit of generation quite large enough to permit of a multiplication of their number sufacest for all possible purposes without encumbering the manufactory with a number of units which would render it moworkable. The condition of efficient distribution had been met, but the system to be adopted must use essably be one of underground conductors. The various electrical conditions requisite to the successful installation and maintenance of such a comprehensive underground system had been provided, and their successful operation had been demonstrated; impresses devices for regulacon were in present operation, and were all more or less practicable. As to the subdivision of the electric current it was only necessary to point to the Paris and Frystal Palace Electrical Exhibitions to show that it had been fully accomrdi-last. With revard to treedom of danger in the use of electricity, all the escential conditions of a general distribution for any purpose whatsoever might be met by the use of a current of such lost potential acto be entirely inadequate to oversome the resistance of, and therefore to traverse, the human body. With regard to fire, the condition was met by the national tion of automatic devices based on the effect of heat on morals, and not open mechanism, and, therefore, absolute in their action; which devices prohibited a rise of tempera ture in any part of the conductors, lamps, or mechanism substent to produce an abnormal heat, thereby preventing fire. As to measurement, various derivewere in existency for measuring the amount consumed by each individual, all more or less practical, some of them being, in fact, superior in accuracy to gas meters. Individuality was effected in many ways, resting principly on the establishment of a fixed standard of resistance to the float of the electric current in each point of consumption. Various devices had been deviced for delivering the electricity into reservoirs located conveniently throughout the district or upon the premises of the individual consumer from which reservoirs the electric current was redelivered to a standard pour of consumption more readily obtainable than was that which was suitable for the exception of the current direct from its primary source. Then, in the neuter of reliability, two practical methods for insuring the presence of the current at each and every moment of time, so as to be ever at the command of the consumer, were now in existence. All work in relation to electric lighting should be of such a character as to bear the closest senting by an expert. He believed the lart of producing light by means of electricity had now passed the experimental stage, and had become a Kina fide manufacturing industry. *** For the supply of the electric light advantageously very large works should be established, which works should in every detail be constructed and appointed with special reference to their utility for the purpose. There were numerous

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special against which were absoluty nelves except in convertion with assumations of electricity or an large wide. "Comparing electricity werk get, there could be to admit that when the electrical output approximated and eggs, the fearer would be lyfe for the report of the texts point that that absolute into short lie between 2s much as prouble, it was except the expense's of electrical highing should be conducted upon the largest calls permissible by the present stage of its development. "In his indicates the expense of the except of the expense of the ex

Gressexamined by Mr. Richards, J. C.—Winess said he was highing from Visint with from Leon to goo lights. The control of the Lampwas in the hands of the consumers. They might turn them out or on when they pleased; therefore, he said, the supply varied from Leon to go to Lungs. He thought deteriting should be allowed as bour to establish ited at gar, that,

in fact, it should not be restricted.

By Mr. Fonder. The thought it was desirable that some authority should exercise control over the tension or pressure in electric copplies, so as to quand against danger from fire and danger to life."

No. 12.

TWELFTH BULLETIN.

The Edison Electric Light Company

65 FIFTH AVENUE.

(These bulletins, originally issued as a convenient way of answering the inquities of distant agents, as more, in response to numerous respects, sunt abort to all stockshollers, togic them information of the progress of the Company and of other matters of greater or less interest connected with electric lighting. Agents are particularly requested to communicate to the Vir-Peckellet whoteverpartical points of general interest may be developed by their experience in invatalling or operating our lights o

NEW YORK, July 27th, 1882.

PROORESS IN THE FIRST DISTRICT, NEW YORK CITY.

The street-usins are now all hid and the entire network of madeground conductors fasished, agreequing over Sooon feet, including mains on the block fronts, street intersections, bridge intersections and feeders. Homes connections between the street-mains and the wires in the houses are being rapidly made, neters are to be put in, and many of the larger consumers of light are retitler adapting their gas fatures to the chettic light, or are put-ting in new fatures especially designed for sur lamps. The loand of Underwiters allow us to at one introduce our conductors into huildings under the limitations set forth in the following circular.

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" NEW YORK BOARD OF FIRE UNDERWRITERS, COMMUTTEE ON POLICE AND ORIGIN OF FIRES, Bosen Brance

No. 115 BROADWAY, New York, July 6, 1882.

THE PURSON PLECTURE DEPARTMENT OF HE NEW YORK

GENTLEMEN-In accordance with your respect for a letter which you can show to your customers, we beg to say, that the introduction of the Edison conductors from the street mains into the buildings will not all itself affect the insurance on such buildings, provided that the exposed ands of the wires or rods are covered with insulated tope and separated from each other by pasteboard, and a metal cap is screwed on the extreme end of pipe, and also provided that no connection is made between the service pipe and the house wiring,

Before such connection is made, however, and the Edison light is used in any building, the wiring and arrangements in such building must be examined by the authorized inspector of this Board, and a certificate of conformity given.

Respectfully yours.

WM. A. ANDERSON,

Chairman of Committee."

The equipment of the central station building in Pearl street is also finished. Fire was built under the boilers for the first time on June 29th, and on the next day the small engine used for the coal conveyers, blowers, &c., was started and all that portion of the equipment was found to work well. The first steam dynamo was started July 5th; and, July 8th, a satisfactory experiment was made on 1,000 lamns arranged on an inner floor. Since that date, some of the other engines and dynamos have been carefully tested with the 1,000 lamns, and the details of their adjustment perfected. The field regulating apparatus has also been tested, and the electrical indicator, the first ever used on so large a scale, has also been found satisfactory. This regulator is used in connection with regulating the electric pressure

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throughout the entire district so as to keep the candle-power of the lamps uniform irrespective of changes in the number of lamps burning.

One of the most important tests, namely, the strength of the iron structure upon which rest the six steam dynamos weighing 186 tons, has just been finished. At the request of Mr. Clarke, two outside engineers, experts in iron structures, were called in to make the tests, and to pass upon the reports touching the strength of the structure, heretofore made by our own engineers. These two experts, Mr. C. Schneider and Mr. A. Schweizer, have made a favorable report, stating that the "structure is sufficiently strong to carry the loads imposed upon it, which produce a strain of 12,000 lbs per square inch in the extreme fibre of the floor beams, which is the customary strain allowed for wrought iron constructions in buildings."

The entire plant in the First District, including the network of conductors and the equipment at the Central Station, having now been tested from a mechanical stand-point, the next thing to he done is to test the plant electrically. This will be done by Mr. Edison personally. Many tests and experiments both of a scientific nature and as furnishing data of commercial value to us in connection with future Central Stations, will now be made. Light will not be furnished to customers, or, in popular language, the "district will not be lighted up," until these experiments shall have been finished. Probably they will take about

BORDEAUX EXPOSITION, FRANCE. The Edison light will be used in the theatre of the Bordeaux Exposition, also in the orchestra, the garden and the aquarium, requiring an installation of alunt 200 lamis.

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ADIRONDACKS, NEW YORK. HOTEL LIGHTED. The Prospect House, Blow Mountain Lake, Adirondacks, N. N., adiplied with a plant consisting of two X dynamos, 275 A hamps, and 75 Bamps. It is not intended that all of these lamps shall be run at once, the equivalent of 135 A hamps king the maximum to be run by the two dynamos. The holler is fired exclusively with wood, which is worth twenty-force emits a cord, and the first night the hamps were lighted, 125 fights were run is is home with only one quarter of a cord of wood, at a cust of 655 cents for fuel.

ROME, ITALY. A small Edson plant has just been installed under the direction of Monsienr Mengarini, Professor Technical

WINSTED. SILK MILL TO BE LIGHTED. We have received an order from the New England Fin Company, Winsted, for one K dynamo, and 350 ten cantlle power lamps to light their silk mill. The plant is to be installed before September 1st,

FINLAND. The plant at Tammerford consisting of 240 B lamps has now been running more than four months, and is so well liked that orders have been given for the plant to be unreased to 1,000 lamps.

TRE PARIE EXPOSITION. REPORT ON LAMPER. The report of the Shi-commission on learndecent Lamp, International Exhibition of Electricity, Paris, 185, has at last been published. It is lengthy document containing an exhaustive description of the four incandescent lamps exhibited, also a critical analysis with experimental results of the efficiency of each lamp. The lamps reported on are those of Edinson, Swan, Maxim and LaurFox; and the supernority of the kdison lamp in every respect is established, and especially in respect to (1) high resistance, (2) loss of entrent per minute, (3) comparative energy required, (4) number of lamps per horse power, and (5) general efficiency.

First. Regarding the important economic feature of high resistance, the reput sets forth as one of the "candissions" of the commission, that there is "greater eromony in high resistance lamps than in how resistance." Accordingly the resistance of the four different lamps reported upon was variefully measured. The result appears in the following extract from the report.

"The resistance of the lamps cold was measured on a Wheatsome's better of the ordinary form and in the small way. The Edlem hasps were taken at random from the stack on loand. The Soom lamps were furnished by Mr. Edimunds, the Lam-Fore lamps by Mr. Steener, and the Maxim lamps by Mr. Lawkwood. Twenty-form of each were taken recept the Lane For, of which only fifteen were furnished), and ten were selected from these for the tests. The fellowing are the results oftained.

Number	Edmon	7920	Laureten	Maxim
1	237	74	5.3	73
2	233	50	34	14
3	263	54	3.6	76
	2641	73	56	74
. 5	251	55	34	74
6	225	72	50	71
7	227	.19	5.5	65
4	249	67	52	63
y	219	55	37	65
110	237	52	53	73
Mean	241	59	35	74 "

Second. The loss of current per minute in the case of each lamp was tested, with the following results, set forth in the report: Edison lamp, 0.2483; Swan lamp, 0.2695; Lane-Fox lamp, 0.2647; Maxim lamp, 0.2586.

Third. The efficiency and economy of the Edison lamp are further shown by comparing the electric energy required to illumine the different lamps. The report shows that when the lamps are burning at 16 candles, the kilogram-interes of energy required for the various lamps is as fullows: Edison, 5911; Swan, 7,659; Lame Pox, 7,089; and Maxim, 7,939. At 32 candles the fullowing kilogram-interes were required: Edison, 7,664; Swan, 967; Lame Pox, 8,956; and Maxim, 7,094.

Fourth. The number of lamps and candles per horse power were exhaustively tested, full details of the tests being given in the report. The Edison lamp was found to be the best, as appears by the following extract from the report:

"SUMMARY OF RESPECTS

1-	α.	Ar Si	tion Ca	udie.		
			kdi***	****	lancition.	Masse
Lamps per horse-power			12.73	144.71	10.61	9.45
Candles per horse-power			toda a	177 02	173.58	151.27
Lamps of sixteen candle horse-power .	. 1*	•	12.25	D.12	10,85	9.45
plas,	.tr	736	tetar i	indies.		
Lamps per horse-power			9.85	7.90	b.47	7.50
Candles per horse-power			307.25	262.49	276.80	239.41
Lamps of 32 condles per h	orse	power	9.60	8.20	8.65	7.48

Fifth, The relative efficiency of the four lamps is set forth by a series of analytical tables, which are summed up in the report as follows:

"The relative efficiency of the four longs examined, expressed in Carcularities of 7.4 sperimeterl canalies each, produced by one horse power of current, Is as follows: (A) Alt for canalies: Endon, 76 5; Soura, 24.4; Lane-Fox, 23.5; and Maxim, 20.4; (I) as Jz randles: Edison, 41.5; Lane-Fox, 37.4; Soura, 555; and Maxim, 254."

The full text of the report was published in the London Electrician, June 17th, 1882, and copies of a reprint can be had from the Edison Company, No. 65 Fifth Avenue, New York City. PAWTUCKET, R. L. ANOTHER COTTON MILL PLANT.
We have received an order from the Slater Manufacturing Company, Pawtucket, R. I., for two L dynamos with 325 A lamps.

WATERVILLE, MAINE. ANOTHER FACTORY LIGHTED.

A plant of one K dynamu with 250 A lamps has just been ordered for the Lockwood Company's Mill No. 2, at Waterville.

DANOER FEROM COA. An explosion of gas recently occurred at Havens, in the evening, which left jear of the chy in inkriness. It is demonstrated that the water main rested on the gas main and both pipes becoming broken on account of settling, the gas entered the hourse through the severs, and there explosed with grant force, tearing up floors, demolsking farmiure, singeing lain and custing several control. Several houses were simulationarily injured in this way, and the Several houses were found in state norm (1) of the Fall River Neamer, Providence, on May 4th, incronscious and meanly sufficiented by gas with which the statemon was filled. It was taken for granted that they does not the gas on criting, but the opinion of Mr. C. H. Dis, published in the New York 50s of May 3th Last, Infrigor yan a different theory on the subject. He says:

"I meretion the 15th Here hand ferromally." The earth was included, in the case of the tree were already with a few for present season and make Turkly with a came down from Edit Store in the Processor, and occur here are a processor of the came of the control o

* * * Fire Marshal Sheldon in his report on the fires in this city in 1881, states that 32 fires in that year were directly caused by gas, 28 of

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which were by the igniting of escaping gas, 3 by explosuous of gas and 1 by explosion of gas meter. It also teal has tension to free from window curnians, goods in stores or show windows, Christmass, chotting, diapper, and woodswick, ignited by gas jets, humps and candles, of which free there were 99 in the year 1881. • • • *) The service of the ser

NEW YORK CITY. DRY 000D8 STORE TO BE LIGHTED. Messrs. Aitken, Son & Co., corner Broadway and Eighteenth Street, New York City, leave ordered a Z dynamo, with 36 A lamps and 36 B lamps, to light their store.

THE RUBOPEAN COMPANY START A BULLETIN. We have received from Paris the first number of a Bulletin, dated June 24, started there by the Compagie Continentale Edison. We give it a hearty vectome. It is a small pamphlet modeled after this Bulletin, although printed with smaller pages and larger type and containing less words to the page, our pages containing 38 wurds, while the French Bulletin page contains only 29 words. Any stockholder is the European Company (The Edison Reterrie Light Company of Karope, Limiterd), heisring to have the French Bulletin analied to bin, race doubletes be arommetalted,

if he will send his address to the Compagnic Continentale Edison, 27 Chaussée d'Antin, Paris, France.

THE GRIGAGO COMPANY. The following is a list of the stockholders in the Western Edition Light Company, just or panited in Chicago. The Company last stem a building and commenced business at Nos. 51 and 53 Walesh Ave. The stockholders are as follows:

Adams, George E.	lones, Huam I.
Allerton, Samuel W.	Keith, Talsen
Barrett, J. P.	Louderback, 1) 11.
Dishop, 11. W.	Merrill, Samurl
Bliss, George 11.	Mosely, John A.
Bullwickle, B. D.	Perkins, C. E.
Calon, J. D.	Pullman, Grorge M.
Clarke, George C.	Rand, William II.
Clark, John M.	Roper, John
Clowry, R. C.	Seeberger, Auctions 1
Cowles, Alfred	Sodieror, C. D.
Crerar, John	Sherelan, P. H.
Commings, C. R.	Simmons, Z. G.
Dane, J. W.	Sprigue, O. S. A.
Drake, John B.	Smith, William II.
Elliots, Henry	Stager, Auson
Fargo, Charles	Sturges, George
Farnell, C. It.	Thompson, John I.
Farwell, John V.	Treat, Samuel A.
Field, Marshall	Wad-kay, T. V.
Foliz, Fritz	Williams, Edward 11.
Hereard, W. H.	Williams, Norman
Johnston, P. 11.	

The officers of the Chicago Company are Anson Stager, President; John M. Clark, Vice-President and Treasurer; D. H. Louderback, Secretary; Gou. H. Bliss, General Superintendent; and P. D. Johnston, Engineer.

THE LIFE OF OUR LAMPS AT HOLYOKE. Mr. Bancroft makes the following report, July 20th, about the life of our lamps

in Mill No. 3 of the Merrick Thread Co., Holyoke, Mass. He saws:

"The 93 lamps in the Merrick No. 3 mill were put he operation April 5th, and on the morning of to-day. July 20th, had completed a run of 222 hours, with a low of only five lamps beared out. The longest run was planted, and the planted out. The longest run was planted to the planted out. The disparance when the planted with the planted of the planted out to the planted out

MR. BENNETT'S YAGHT NAMOUNA AGAIN. A written report received from the yacht Namouna, which is lighted with an Edition plant as published in the Ninth Bulletin, states that only the toyage across the Atlantic the lights burned without any accident and gave satisfaction to all on board.

THE WORUMBO PLANT TO BE DOUBLED. A plant of one Z dynamo with B lights was installed in one of the mills of the Worninho Company, Lishon Falls, Maine, as mentioned in the Tenth Bulletin. The plant has given such satisfaction that we have just been ordered to double it. The lamps are used in the weaving room where 8-candle lamps are required for light goods and 16-caudie lamps for dark work, particularly navy blues and blacks. Even with the darkest goods, measuring 82 inches in the loam, a weaver by means of two 16-candle lamps over his loom, can keep run of his bobbin in the shuttle boxes. He can also draw in his yaru, by swinging the arm of the bracket around over the warped beam, between the harness and the frame. But more important than all this, the weavers can tell colors. One of the most difficult tests is to distinguish "water blue yaru" from black, a difficult thing to do even by day light, yet the weavers succeed quite well in distinguishing those colors when using our lamps. The shuttle hoxes at each of the looms are made up of four or more smaller boxes, placed one above the other, and it is

into these smaller boxes, measuring fitteen inches in length and ten inches apart, that the rays of light must be east. The officers of the Worumba Company speek highly of the quickness and thoroughness with which the installation of our plant was reade, the plant laving been installed by two men in ten days.

PHILADELPHIA. ANOTHER NEWSPAPER TO BE LIGHT-EM. The plant in the Public Ledger furdding has proved so smisfactory that another Philadelphia newspaper, the Public Rosof, has decided, to introduce our light, and has given us an order. The plant will consist of one ft dynamo, 250 A lamps, to field the new Record fundding mow heing faint on Clessiant Sixen.

EDISON AIGHT PIXTURES FOR HOUSE. Messys long, many & Company there pass somether are and ordinged utilized of their catalogue of electric light fixtures for houses, including their catalogue of electric light fixtures for houses, including stationary, deck and swenging brackes, hand lamps, order particle lamps and a large variety of other applications. There are also designs of combination light factors for both electric light and gas, as feature to which the firm have given a good tied of attention. We notice that they have dropped the use of the over cleaned of the station of the design of the control of the controller, which is already in general use in Regium to indicate an over cleaned light and gas, as for the rankage of Messys. Bergmann & Company can be udenticed in their factory, No. 108.

Wooster St., New York City.

NEW YORK CITY. AN INCREASED PLANT. The small plant of 15 lights, belonging to Max Ams, 372 Greenwich Street, and mentioned in the Tenth Bulletin, gave such satisfaction that Mr.

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Ams ordered his plant increased to he lanus, and the increased

CAPE TOWN. PARLIAMENT LIGHTED. The House of Assembly at Cape Town, Cape of Good Hope, is now lighted with a Z dynamo and about to highs. The Cape Times, of May 11th, Says:

plant has been started with success,

"The House of Assembly was publicly lighted for the first time last evenme by the electric lighting apparatus which has been fitted up by a representative of Mr. Falism, the celebrated American inventor. The light was tried outhe previous evening and the result proved quite satisfactory. At five o'clock pesternlay afternoon the light was turned on without any presions warning, and before the honorable members recovered from the surprise or rasioned by the novel right, the House was filmminated by the beautifully bright and steady glore of the forty-four lights placed along the walls. There are thirty-four of these lights in the lastly of the House, and ten in the public gallery. The prewait experiment has been undertaken by Mr. Edison, at the instance of the Colonial Covernment, with the view of runbling them to decide whether it is expedient to introduce the electric light into the New Houses of Parliam The apparatus has been fated up under the direction of Mr. C. Hortsck, who was specially sent out by Mr. Ulison for the purpose. The engine and appa rous are placed in a large shed at the top of the gardens, and are connected with the House by means of an insulated wire. The engine used is a tenhorse power one, and the generator is known as the Edison Z dynamos machine, calculated to produce current sufficient for 60 sisteen-candle lights. There was a large attendance of the public in the House last evening, and much satisfaction was repressed alike by members and spectators with the effect produced by the bright, sell, and penetrating light."

HOLYCKE, MASS. WOOLLEN MILL LIGHTED. The Germania Mills, Holyoke, Mass., have ordered a plant consisting of one Z dynamo and 6o A lamps, to be installed at once.

BRUNN, AUSTRIA. Contracts have been concluded to light the new theatre, to be finished in Getober, with the Edison light. The installation will enastis of Sox A lights, and will be run every night, including Sundays, for ten months in the year. The dynamus will be placed Sox for from the theatre on a piece of ground furnishall by the City. The theatre will have no gar and the clandediers. and fixtures will be made for the Edison light alone and cannot be used for gas.

THE SWAN LAMP PATENTS. The following report on the Swan Lamp Patents, originally prepared for the instruction of our agents, is now printed for the benefit of our stockholders.

Ms. Joseph Wilson Swan, of England, after whom the "Swan Loup" is named, has only two patents in the United States, relating to incombine the detection of the Swan Agrand Swan applied for April 12th, 1850, and granted United Typh, 1850; the second, Nr. 243,435, was applied for June Ords, 1880, and granted November ght, 1880. These are the only patents on the "Swan Lamp" in the United States.

Refere stating what these patterns towe, let us see what they do not cover. In that regard, Mr. Swanis on a ministics are trapteture. In his specification tiled when he applied for his first pattern (No. 23),445), he says: "Wis invention relates to that kind of electric hamp in which hight is produced by the inaudiscence of a continuous conductor of carlon enclosed in an exhausted glass balls, and provides means for increasing the charality of the sails kind of hunp." Just what is meant by this statement prepared by Mr. Swan himself should be carefully mode. What these he mean!

First. Swan does not claim himself to have invented an "electric lamp", but merely to lave invented "means for increasing the durability" of one. In other words he claims only an improvement on an existing lamp.

Second. The "kind of lamp" which his invention "relates to", was one which he found in existence when he undertook to impose it; one, he says, "in which light is produced by the incandescence of a continuous conductor of carbon enclosed in an evaluated glass

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Thind. This description of an electric lump, which Mr. Soon undertook to improve, is an exact description of the Elison incanobscent lump, on which a patent was allowed to Mr. Editon in the Control of the Control o

Thus it appears that Mr. Swan himself dischains to have invented an incandescent electric hamp, and that all he china to cover by his patents (thus is true of his second patent as well as his first) are merely minor points of ne channel detail, being merely alleged improvements in the durability of an incande-cent lamp already in existence.

Let us now see just what these alleged inventions claimed by M. Svan amount to. His first planet (No. 23,444) has four chains, viz; fist, platinum caps connected to both the glass and the leadings in vire, second, the carbon hosp or however, kind, the arbon made of parchiment upper lent into shape, third, the curbon made of parchiment upper, and, fourth, conting the leadings in wires and caps with glass or caused. His second parent (No. 234,454), contains two claims: first, parchimentating thread prior to its carbonization, and, second, making entanged each therein by wrapping material therearound and comenting the wrapped material by parchimentization.

Are these alleged inventions, admitting that they are such, of any value? Let us consider them in order,

In Swan's first patent the first claim is for platinum caps uniting

the glass and leading in wres. Mr. Edison uses the plannum leading in writes, but omits the cap.

Mr. Swan claims that the sace of the plannum cap is an improvement on Mr. Edison in meltid, because a better counter may be made between the platnum and the glass. The fact is Edison melty mel hold ways and the reast of this experiments was that the contact was jet as good in one case as in the other, and that the outsion of the platnum cap, which abone costs morely as much as Edison's entire lamp as now manufactured was an important step nowals economy. Business that the glass, surely sands increase of the platnum surface will not mendy the doder. If there be any plefect in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verification and the same placed in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verification of the same placed in such unson in the one rase, a will still verificate our content of the other.

The second claim in Mr. Swan's first just at low a straight stop of paper heat may a do not measured. This was the four first must be part firsten and a probabily by every other experimenter on large. But Edwan improcal upon in His improcuration consocion funding that Edwan improcal upon in His improcarment consocion funding that Edwan improcal upon in His improcarment consocion funding the paper into duage, instead of heating a, it being excludes to any one that by carting paper into exect slong, genue midenaity of result can be attained than by heating, and to special cure or work is needed in enearing that all loops shall be uniform.

The third point in Swan's first patent, and the first point of his second patent, is parchimentization prior to carbonization. Edison tested this acrety as 1878, and he soon after mentioned it in a caveat, but he found no gain in this abilitional step of parchimentization. Besides, it cost money and inverseed the cost of production of the finished lamn.

The fourth claim in Swan's first patent is coating the leading-in wires and caps with glass or enamel. This is to avoid the difficulty arising from "occluded gases." Mr. Edison long ago dispensed with the use of this coating, and states that is is an innecessary trou-

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ble and expense. He makes his lamps without it, and yet finds no difficulty from "occluded gases." The use of the coating, claimed by Mr. Swan to be an improvement, unnecessity increases the cost of the lamp, and shows that somewhere in the lamp something has not been properly provided for and done, or, in other words, that there has been prov workman-slike.

The only retaining point in the Swan patents, is making the cultaged entils by surphing. This is either so cheap, effective or simple as the later plan invented by and now used by Mr. Edison, namely, simply striking out or eptting the carbon with its enlarged cush knongenous with the lowly. By the latter, there are no additional steps, while by the Swan plan, there is an additional step, reordinate relivous and delectic unsuplation, adding to the cost.

It thus appears that Mr. Swan's so-called improvements on parts of the meand-seem Impa are, commercially speaking, of fittle value. Every point channel by Swan, is something discarded by Edwan has march towards simplification, which means the best result, and the best service for the least means.

Having thus shown what the alleged inventions in the two Swan patents amount to, let us see whether Mr. Swan has a good title even to what he claims.

Upon the second and third points in his first patent Seau is a already in interference in the Pitters Office with look Edition and Maxim. On such points, Sean being a foreigner, the carries and also of inventions which mader the law be will be permitted to the prives, its either the date of flung his application in this country, to a superior of the private of the private private private private via April 1741, 850, or the date of his carriest foreign publication, namely, his English patent of July 20th, 1850. Both Lifetion and Maxim, in their preliminary statements, set up the dates long auterior to Swan's carriest legal dates in this country, and there can be no doubt that one or the other will prevail

against him and receive the valid patent on these points. As to his second patent, applied for June 16th, 1880, which is the earliest date of invention our law assigns to him, being a foreign inventor, as against a citizen inventor, Mr. Edison attarks him on the broad grounds of making enlarged ends by wrapping around the end of the carbons. This invention was not only made, but was publicly mentioned by Mr. Edison long before Mr. Swan's earliest date of June 16th, 138c. Indeed, it was even described in one of Mr. Edison's patents (Edison's Canadian patent No. 11,520) filed before that date. There can be no doubt, therefore, that Edison will prevail against Swan on this point. Thus of the few things claimed by Swan in his two patents, it is certain he cannot hold two of them, and it is probable, for reasons which should not now be divided, that he can not hold any. But even if he could hold their all, Mr. Edison would be entirely unaffected, because Mr. Swan's patents are simply for matters of detail, and Mr. Edison has long since abandoned them for better methods. Swan covers nothing Edison oses, and what Swan uses Edison has left behind.

Thus it appears, with regard to the Swan patents, test, that they do not cover an electric lung, and estatin no broad or fundation to cover an electric lung, and estatin no broad or fundaiental principles, but are matters of mere mechanical detail; seecond, with reference to a put of the allegal intension embecad in the her petents, Swan is in interference with two other investors, and there is every reason to believe the will be deducted, this, that the nat randof making an incandecent lamp has advanced so for since Swan; that the allegal inventions were made as to make them doubter; and, fourth, occur if they were not doubter, they add so much to the cost of labor and notestal, the gas nearlically nowalities.

But it must be remembered that even if Mr. Swan's patents were for a lamp instead of for a few details of one, and even if those details were important instead of heing worthless, his patents would 18

still anomaly to nothing unness he had also invented and patented a comprehensive spow off using them. In this respect Mr. Sean has modifing. He has no spatem whatever on any system or on any of the almost intamation details needed in a lighting system, involving regulation, skyribution, measurement, combinetors, skety-inches, markets, flandbaffers, franckers, flory flittles, nethers, they flittles, retained to the Swan patents comfer any right on hom to use any such today, or even to make a lamp. The Sightess not of what he alleges to be his ventual to make a lamp. The Sightess was of what he alleges to be his inventions involves infrangement of underlying patents granted to another. All these details of the necessary parts of a system of fineadiscent lighting have been dail-horized lamp patented by Mr. Eddson. It is impossite for the control of mindre an intermediscent ham, without them.

In this connection, a concies autement sloudb be made of Mr. Bission's peterns, including his findimental patents on an electric lawy, bits peterns on methods of manufacturing a lamp and mechanical details, together with to krep number of presents on the important details of a system of incandescent lighting. The fundamental patents, which give Elison a monopoly of the incandescent lamp, are seldforms, namely, No. 272,569, dated Junuary 27th, 1881; No. 272,7239, dated May 4th, 1850; and No. 290,355, dated Junuary 1850; and 1850 and 1850

- t. An electric lamp having a continuous conductor (without regard to its material, resistance or mode of preparation) and an exhancted glass enclosing globe.
- An electric Lamp having a continuous carbon conductor (irrespective of its material, resistance or mode of preparation) and an exhausted glass enclosing globe.

. . .

 A filament of carbon of high resistance secured to metallic conductors (i. c., the leading-in wires).

4. The method of manufacture, i. e., first, separately forming the euclosing globe, and the support for the carlion, and then affixing the carbou upon the latter, uniting the globe and support and then exhausting.

The broad principles covered in the above named fundamental patents allowed to Mr. Edison are so exclusive that it is not too much to say that neither Saan nor any one doe has made on make a successful incandescent lamp without infringing every one of the above nations.

that these paicents allowed to Mr. Edson on his lamp, are only a small portion of the paicent allowed to him in connection with the use of the lamp. Up to the proved mine note-5 that to patents have been allowed Mr. Edison, in the Printel States alone, on his lamp and on the details connected with a naminature or the ex-med her also has to a additional applications for patents on the same subject more availing extraination at the Patent (Blee. These patents cover such subjects as the lamp, regulators, dynamos, meters, motors, conditactors, undergound mains, junction boxe, seeker, chandlelers, brackets, and many other devices, altogether constituting a complete and perfect ration of electric lighting.

The whole subject of the Swan potents in the United States may be summed in as follows:

18t. Mr. Edison is an original inventor of a new type or genus of lump. Mr. Swan does not claim to be such an inventor, and claims only to have made improvements of detail in such a class or genus. Indeed Swan dichaims the inventor-thin of the class or genus.

and. This new type or genus of lamp is patented broadly to Mr.

3rd. All that Mr. Swan claims are only some nanor features of

alleged improvements, but it is doubtful if they really are improvements, all of them leaving been tried and discarded by Edison, for simpler and more economical means equally or more efficient for the ends sought, long before Mr. Swan's patents were issued.

th. Mr. Swan's tille to some of the points or improvements he even does claim, is in litigation. If he prevails in the litigation, he cannot injure Mr. Edison, as Mr. Edison more more of the points in controversy. Nor could Swan even then make and use a lamp, for he must infringe, in using his own alleged inventions, several prior fundamental patterns previously issued to Edison.

The Swan Lamp has not yet been manufactured or sold in this country. Until that is done, or some other overt act is committed constituting an infringement, no legal proceedings against the Swan Lamp can be began.

THIRTEENTH BULLETIN.

The Edison Electric Light Company

64 FIFTH AVENUE

Clares builedny, ariginally issued as a contenient nay of anowering the impuries of their agents are may, in response to municipa reports, entitled to all suck-boilers, to give them information of the pergoes of the Company and of after matters of greater or less interest connected with electric lighting. Agents are particularly responsed to communicate to the Vec Probeint a interest practical points of general interest may be developed by their experience in studieg or optating our lights.

New York, August 28th, 1382.

PROORESS IN THE PIRED INSTRICT, NEW YORK (17EV, FAVEYBRING) From we complected. The tests and everyments referred to it the last Indiabet are being rapidly mole. No critino obstacles have as yet been developed to delay the early leighting up of the entire blainties in a ratious parts of the district have already been lighted. The wares in all the wine lonnes in the dustrict, up of places alongether, are being connected with the contest of their district, they fluces cathered, as religious connected with the contest of their district, they fluces cathered, as religiously, and indictional houses being more connected and inspected duly. Meters on measure the current sold to each comment, also extraduces an indicate the fluctuation of the standard of the stand

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MANGHESTER, ENOLAND, AN EXHIBITION LIGHTED, At the annual meeting of the S-ciert of Chemical Industry, Manchester, July, 1852, an exhibition in the chemical Indooratory, of the present development of the dye and critica print industries, was lighted by an Halicon plant of po Indusp.

LORRAINE WOOLEN MILL TO BE LIGHTED. Meses, W. F. & F. C. Sayles, Saylesville, R. I., have ordered a point consisting of one K and one L dynamo, with 400 sisteen candle lights, for the Loraine Manufacturing Company, manufacturers of fine wooden goods.

AMBERDAM, ROLLAND. A GENTHAL STATION. The Edition Company in Holland laive purchased ground for a central station at Amsterlam, and laive ordered two scans dynamics like those used in the New York City Pearl start station, to be delivered in October. The central station would have been commenced at an earlier date, but there has been some difficulty in obtaining the right of vice vaniet the streets.

PARIS, FRANCE. EDISON LIGHT IN THE PREFECTURE OF THE SEINE. A plant of to Edison lamps has been in operation in the Prefecture of the Seine for three months past, and has given entire satisfaction. This plant was taken into France from abroad, by special permission of the French Minister of Commerce.

HUDSON, N. Y. A MILL LIGHTED. The Harder Knitting Company, Hudson, have ordered a plant of one I. dynamo and 150 A lamps for use in their new mill. The building is said to be fitted with every known improvement in machinery, including a 140-H. P.

Corless engine, and two tubular Balcock & Wilcox boilers. After carefully investigating the best known systems of artificial illumination, including gas mechanes and are lights, the Harder Company decided to adopt the Edison light.

EDISON'S 201T AQAINST THE MAXIM LAMP FOR IN-PRINOEMENT, PARIS. The out bought at Park, Fennee, by the Edison Goupany against Hums S, Maxim, for infinging Edison's meanile-sent destric light patents, has been need for tida, and seams contrained that the train will take place in November. The management of the sun in lockalf of the Edison patents seemlusted by MM, Pawiller and Octar Palented, Assaches 31, 1 circum, soonic and M, Armengand, patent coursed and expert. Miditional experts, prominent to scientific circles, here also been retained.

EDIBON'S SUIT AGAINST THE SWAN LAMP FOR IN-PRINOEMENT, LONDON. A point sut has been commenced in London by the Ebbon Company, against the Sant Company, on the ground that the Swan Isaay indiages the Ebbon. The fundamental principles of incumbercut interper are more in the sun. The techniques principles of the property of the prop

HOLYOKE A MILL PLANT ENLANGED. A plant consisting of a Z-dynumo, 120 il hump, vas sarrell last April in the unit of the Merrick Thread Company, Holyoke, Mass. Since that time the company has made a thorough test of the system as adapted to their work of humanifectring threat, and have now decided to increase the plant from 120 to 360 lump. The increased plant will consist of one K dynams to be insufficial at one.

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BERLIN, GERMANY. BREWERY LIGHTED. A plant of t2. B lamps has just been installed in the Boelimisches Branhaus, lighting the cellats and malt house of the brewery. The following interesting description of this installation has been received from Mr. Seubel:

"There are three large malt cellars where in order that the temperature may be kept low, not gas is used, and even the smilight is excluded. Heretofor the lighting has been done by candles. Very little light is needed for making purposes, so there are but 15 It lamps in a space of about 1500 smare meters of favor. The lamps, which can be turned on or off by one switch, are suspended downward without shades, the low whitewashed ceiling acting as a reflector. The lights in the sualt house are run day and night. In the fermenting and storage cellus, where the temperature most be kept nearly at zero, the walls are seet, and the earls-one and, dis barged from the fermenting over acts on the ordinary modation of wires and on the iron parts of the sockets, above the plaster portion of the lamps. This made the wiring and lighting of those cellure difficult. But all trouble has been occuoner and the installation has been made in such a way as to be permanent. In the termenting cellus portable lamps were required, to replace randles, and a good light was required for July washing." To make our tamps suitable for these require ments, we placed our onlinery out out cleats in small cast non-boxes, provided with a door with rubber packing, all over the cellar. Six of these Lastenis with a B knop or each were made too cach celler, and a stoot colder tole & it temeters long with good flexible double conductor noide was attached to each lamp, the other end of the devable conductors being connected to the ent-out clear and provided with a sort of cut out plug, by means of which the conduct ing rord is attached to the connection law. The socket is surrounded with a tin collar so that the lamp can be reversed and set on the theor for washing the inside of the tubes, while stout from wires outside act as a guard against locale age. Whenever a workman needs light in any part of the cellar he attaches a lump with conducting cord at the most convenient connection lov. This portable lamp has met the approval of the cellar master and the director of the between, In the storage cellars, similar connection boxes are used, smak into the leak work so as to be out of the way in moving large barrets. In one part of the storage (ellurs, the barrels are stored in seven tiers and built up three high to the reiling. Light is there required for Laying in and filling rappy burrels, for which purpose 4 B Laups are fastened on the coiling with a good reflector. Light is also required for drawing off the beer into small casks, and for that purpose the portable lights alone described are used, except that an iron screw thimp leattached to the lantent, capable of being scienced against the head of the harrel. The brick work is or asionally washed oil with

dilute-sulphuric acid, consequently the combactor, have been covered with lead and sunk in the wall."

THE THURBER PLANT TO BE DOUBLED AGAIN. The first plant installed in the wholesale grocery store of Messis, H. K. & F. B. Thurber & Co., New York City, was a single Z dynamo. After trial, the plant was doubled to two Z dynamos, as reported in the Eighth Balletin. We have just received an order to double the plant a second time, and a K dynamo, 25.5 lamps, will it once be installed Hereafter they will use the Edison light through out, to the exclusion

CHICAGO. CLUB, THEATRE, STORES AND RESIDENCES TO BE LIGHTED. Five plants are now being installed in Chicago. as follows:

- (1). The Calmiet Club is to be lighted with a Z dynamo. 60 sixteen candle lamps, as soon as the plant can be installed
- (2) A plant of one 1, dynamo, 125 sixteen randle lamps, has
- been ordered for the Academy of Music. (3). The residence of Mr. N. K. Farhanks is being equipped
- with a Z dynamo and 60 sixteen candle lamps
- (4). A plant of one K dynamo, 250 sixteen candle lamps, is to be installed to light the residences of Messrs, J. W. Donne, Marshall Field, Edson Keith, and O. R. Keith. The engine and dynamo belonging to this plant will be located in Mr. Donne's stable,
- (5). A plant of one K dynamo, 250 sixteen candle lamps, is being placed in the building of the Western Edison Light Company, Nos. 51 and 53 Wabash Avenue. The lights will be used in the offices of the company, also to supply light to several wholesale stores near by

LAWRENCE. PEMBERTON MILL PLANT INCREASED. Last November a plant consisting of one Z alymmo, 125 B lamps,

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was started in the wearing room of the Pemberion Company, Laurence, Mass. The plant has given such satisfaction that the Pemberson Company has solvered it to be increased by the addition of two L dynames and 230 A lampe. In this connection the following letter from Mr. Clarke, the agent of the Pemberson Company, and never before published in the Bulletin, will be of interest:

"PEMBERGON COMPANY,

Agent's Office,

LAWRENCE, MASS., March 6th, 1882 The Papers Company for Isolated Lightness:

Drivi Since: We have now been using the Edward light in our wearing round to over three nouths, and are glod to state that it has given, and is now giving us good stated nise. We are lighting two lower notation have yorked goods with new 'A' hung, and our weavers are enabled to distinguish the different shades of cover results. The stradience of the light, it safety, it lefting particularly free from heart, the slight care required in the operation of the dynamic, all comfine to make be only light a destrade now the numerical results.

Your- truly, F. L. CLARKI,

LINGOLN, RNOLAND. THE LIGHT ENDORSED. Messas, Robey & Company, Limodu, Engkand, have written a letter, July 11th, to The Edison Electric Light Company, Limited, London, strongly endorsing the Edison plant in use in their shops. The following extracts from the letter are of interest.

"The experimental trial we made of the Dilawa years of dentic, below or work-loops has accorded admindary. We seed in all 12 milly specific one to such stam. The experiment was-imply and easily trial by uncereasing the gas learners and lading the electric lamps to local ago for fitting. Though we used may had hamps, manely 5 scanler poore, yes we found the fighty one used may had hamps, manely 5 scanler poore, yes we found the fighty of the state of the st

fight an irod. We were woulded and the result of the experiment that in some very large works which we are not building, or are partition in Miles lamps only, a few are lightly for the large space, not large lamb and an advantage of the lamb and the levels and so do works and matricely operate, with five the latter and advantage we find in the tree of the Mileson forced-trees lamp, in the protection of the lamb and that prescribed that is the see of a manda to order match lights to light to light the lamb and that pre-fractional to the see of a manda to order match lights to light t

MUNIOH, BAVARIA. A LABOE PLANT. A plant of 4 K dynamos and alous 800 A lamps is song installed in Munich for the purpose of partially lighting up the Mannic Reposition, opening in October. By excell attention will be paid at this Exposition to the general subject of deterin leghting and the size of electricity for power. Accurate easts will be made regarding the efficiency of competing systems of electric leghting. The Managers of the Exposition invited the various electric light companies to compare for the lighting of the theater. Several responded, in bullar the Edion of Company, but the others become one by one withdrawn, the Edion of the theater of the Companies of t

SAN FRANCISCO. A STORE LIGHTED. A plant consisting of one Z dynamo and about 60 lights was started August 1st, in the store of H. S. Crocker & Company.

BALTIMORE. BAY LINE STEAMER LIGHTED. A plan consisting of one Z dynamo and 100 ten candle lamp is being installed on the steamer Carolina, of the Bay Line, running between Baltimore and Norfolk. The lights are to be distributed throughout the dining toom, upper sabous, state monts, and cugate and boiler rooms. In the upper sabous the lamps are to be attached to the present chandeliers.

BOSTON. HOTEL VENDOME. This plant, mentioned in the Eleventh Bulletin, has been running every night since the evening of June 10th, with 62 lights in circuit. The plant consists of 63 A lights, mostly used on the ground floor, 42 being in the dining norm where they are arranged on 7 chandeliers with 6 lamps each, and on one large chandelier with 8 lamps. There is also one lamp on a single bracket, and a portable student's lamp in the office, one in the elevator, 2 portable student's lamps in the reading room, 2 at the bottom of the main stair-case, 3 in the saloon, and one each in the engine room, the boiler room, and the passage way. The dynamo is driven by a small high speed engine, which also famishes power for the passenger elevator and freight elevator, the lamulry, and other machinery in the basement. The daily average service of the lamps is six hours, and the total number of hours during which they have been in use, as per our report of August 15th, was 282 hours. The number of lamps destroyed during this period is eleven. Four of these, however, were broken accidentally, leaving only seven destroyed through natural causes. One thing about this plant is worthy of especial mention, namely, the Edison lamp in the elevator. For that, a cord containing two flexible wires, thoroughly insulated, is attached, like a rubber gas pipe used for the same purpose, one end to the lamp in the elevator and the other end to the fixed wires in the side of the elevator shaft, half way up. The steadiness of the light and the absence of heat are especially noted in the elevator. The testimony of all attached to the fiotel is to the effect that the illumination has been a perfect success. The engineer in charge, states that the amount of energy taken from the engine for driving the

dynamo does not exceed eight hore power; that, notwithstanding the fact that the temperature in the engine room where the dynamo is located, ranges from 118 to 150 degrees, the hortrings are very little heated; and that there is but a very slight wear on the brushes; and the face of the commutator is as smooth as upon the day it was first started in.

THE ADIRONDACK HOTEL PLANT. Regarding the plant in the Prospect House, Blue Mountain Lake, Admontack Monnains, N. V., Mr. G. W. Waters, the engineer in charge, has just made the following report:

"The Effort homotopout device [the plant instable live was statisd by an Jose 168, N.S., and has me silvent any interrupts a very except size. It has me all this various in silvent and the states of the plant consider of two Z dynames, $p_{\rm c}$ and $p_{\rm c}$ has specified as the plant consider of two Z dynames, $p_{\rm c}$ and $p_{\rm c}$ has specified as we take the plant consider of two Z dynames, $p_{\rm c}$ and $p_{\rm c}$ has specified as we take the Tengers can define a six except possible of the own time. The regiver must be sufficiently and we consider the two consumed only one querier of a fart branch world and on a corolidate to this consumed only one querier of a fart branch world when the same and the state of the same and the state of the same and the sam

BUDA PESTH, HUNGARY, RESTAURANT LIGHTED, An Edwar plant of 50 Å lamps and 24 B lamps is giving excellent satisfaction in the Szikszay Rostaurani in the Kerepsk, Buda Pesth, It is driven by an engine placed in a building 100 metres away.

KINGSTON, R. I. PLANT FOR THE PEACEDALE MILL. A plant consisting of one K dynamo and 250 A lamps, or an equivalent of B lamps, as may be hereafter decided upon, is being installed in the cotton mill of the Peacedale Manufacturing Company,

near Kingston. Two A lamps will be placed over each boom wearing dark colors, and two B lamps where light goods are made.

HAVANA. THE LOUVRE PLANT AGAIN. The following extract is taken from a recent letter from Mr. Rich, in change of the Edison light in Havana, regarding the exhibition of our light now being made in the Louvre;

other exhibition continues to more on with madated interest both to the policie and to conserve, and outling remains to the desired at to the workings of the conting plant. It am placed and nonewhat surprised at the perfect working of dynamo Nic top which must the Douver. We have had no oversom to smith the breader or adjust the secrets ince the 24th of May, and untilist the lenshes nor commutator show any perceptibe signs of wear or call a quixt, and believes destinguing of the matching is artishigh in modion."

HIGH ALTITUDES MAKE GAS DIM. The following extract is taken from the *Journal Des Didats*, Paris, July 6th:

When, you high alminders and figure, an argument which the particular of the citers high are resempted and property of the first and agaington. The chernic light home with the same belief in the order of agaington. The chernic light home with the same belief in the chernic deposits of the chernic property of the chernic property of the chernical property

Names.	Altitudes.	Banametrical Pressure.	Blumbating Power.
Paris, Neme, Moscow, Madrid, Mevno,	65 253 595 2,212	0.754 0.747 0.732 1.705	105 103 99 87

We see here three times none light at Paris than at Mexico for the same quantity of gas. It is evident then that the illuminating efficiency of gas in three times greater in Paris than in Mexico."

SANTAGO, OHILL. PLANT IN THE UNIVERSITY. An E dynam, 5.5 A highests running in the University of Chile. On the evening of July 12th, Profess et Julie Zeguv, Department of Physics, and the Technical Physics, and the Technical Physics, and after various experiments with arc builded the Edison plant, and after various experiments with a recommendation of the Professor when the part of the Professor when the part of the Professor when the part of the Professor were those of lumining an Edison colored luminy of the Professor were those of lumining and Edison colored luminosis of resistance bases. The experiments were received with entirely and professor of the luminosis on the part of the lung ambitracy present.

BOUTON HERIALD. ANOTHER NEWSPAPER LIGHTED The Boston Herial blushing, Roston, is being cultiped and the proprietors of the Herial Messer, R. M. Palsier et a., palsier et a

FALL RIVER. THE CONANICUT MILL TO BE LIGHTED.
A plant of one K dynamo and 150 A lamps is being installed in the
Consulent Mills, Eall River. The lamps will be placed so that one
lamp will light four looms.

AUGUSTA, GA. PLANT FOR COTTON MILL. The Sibles Manufacturing Company, Augusta, recently sent an agent North for the express purpose of investigating the different systems of artificial lighting and of reporting upon that best adapted for their cotton mili, said to be the largest of its kind in the South. He visited many manufacturing centres where electric lights are used in mills, and, after seeing our light in practical operation in many factories, reported in favor of the Edison system. The Sittley Company has accordingly given us an order. The plant is now being shipped and consists of two K dynamos with about 400 A lamps,

LONDON. AN ISOLATED PLANT ENDORSED. The following letter has been received, emborsing an isolated plant installed

"Maciniosi Lane, Homerico, J Lonion, July 19th, 1882.

THE PERSON ELECTRIC LIGHT CO., LIMITED: GENTLEMEN: - In triply to your request, we take great pleasure in stat. togetherine, on triply to you request or one good present in some jug our experience of the Elison incandescent electric lamps. We believe ours to be the first factory in London that was lighted with your system, and are at present using 120 of your eight candle-power lamps with a few 16 could power timps. These have now been running a matter of 1,490 hours. during which time only five lamps have given out, and these not until they had been lumning a period of over 900 lours. We find the light from the same a great bom to us in our particular branch of business which is wire covering, and which at the present time we are exceedingly busy in, necessitating us to work boilt day and night, consequently, we gave your lamp a very severe test. The steadines, brilliancy, etc. of the light all combine to make it a most

PHILLIPS IRCOS."

PAISLEY, SCOTLAND. PLANT IN PRIVATE RESIDENCE. The following account of the plant installed in the residence of Mr. A. Coats, Woodside, Paisley, is taken from the Paisley Express,

"By special invitation we had the pleasure last night of visiting Woodside, and were gratified at the sight presented. The entire house-aliming-room, drawing-room, general rooms, boltzoms, conservatory, ferriery, cave, &c., all of which we passed through - were lighted by the Edison incombescent electric light. We may here state that Edison's system has none of the drawbacks usually associated with electric lighting, such as intermittent shadows and on seculy and fitful illumination. There is emitted a well diffused light, which though brilliant and luminous, is not so intense as to be offensive to the eye. On the contrary, it is mellow, pleasing, and steady, without heat or smell. The work of introducing the necessary apparatus to Woodside has been in hour-e for some time, and is mor completed in a manner which is likely to give great satisfaction to Mr. Coats. retained in their places, and have been found perfectly suitable for the change that has been effected from gas to electric lighting. The engine is 12 nomihorse power, driving two dynamos, each supplying 75 A longs . . . The system within the louise is very complete, and so pertext that by an arrange ment of switches a whole suite of rooms may be brilliantly lighted or the illumination may be reduced to a single jet."

BOSTON. MANUFACTURERS AND MECHANICS INSTI-TUTE PLANT. The Edison Company will exhibit its system of lighting at the next Exhibition Fair, beginning early in September, of the New England Manufacturers and Mechanics Institute, Boston, Mass. The Edison exhibition will consist of one L dynamo, two K dynamos, about 650 16-candle lamps, a few to candle lamps, some 32-candle A lamps, a motor, meters, electric tubes for underground conductors, &c. The Babcock & Wilcox Company, New York City, will exhibit one of their tubular boilers, and Armington & Sims, Providence, proprietors of the Lawrence engine, will exhibit two of their engines, one 8x10 and the other 12x21. The boiler and engines will furnish steam and power for the Edison dynamos and will be used exclusively for that purpose.

NEW YORK CITY. THE BERKSHIRE TO BE WIRED. The Berkshire Apartment Association have given us an order to wire for the Edison light their new apartment building, corner of Fiftysecond street and Madison avenue.

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LONDON. EDISON LIGHTS FOR STREET LIGHTING. Mr. William Haywood, Engineer and Surveyor to the Commission of Sewers in the city of London, has published a report made by hitn to the Street Committee, on the results of the electric lighting of public ways within the city of London in 1881-82. It appears from his report, that the thoroughfares lighted by are lights in London, were divided into three districts, each of them allotted to a different are light company. Mr. Haywood's report is based principally on his examination of those three districts. The report states that whatever the excess of illumination given by the arc lights may be over that given by the ordinary street lamp, the value of the tests must be determined by practical considerations, such as (1) miform distribution of light, best accomplished by small lights at small distances, (2) the avoidance of unequal distributions of light and deep shades and (3) the absence of flickering. Tested by these principles, the report states that the excess of light given by the arc lamps was much less valuable than might be supposed. In this connection, and, as may fairly be assumed, in illustration of the superiority of the Edison lamps for street lighting as compared with the are lights, the report speaks as follows of the lighting of the Hollorn Viaduct by the Edison Company:

"The libborn Waber for all spream fine lightst experimentally by the Erlorn Company, who have glaced on measurement have in each game, each large, as stated by the Company, going about the part of each game, each large, as stated by the Company, going about the good and the rose, before, which is kept of the game of the part of the company of the company of the first form another. There is exactly any goat of line Ver lives for the confidence of the company of the Co

The Commissioners of Sewers, in token of the fact that the Edison light was found to meet the essential requirements of street lighting as set forth in the report, have contracted with the London Edison Electric Light Company to light the Holborn Viaduct by means of Edison incandescent lamps for six months, at the same price as gas.

FIRE PROTECTION IN MILLS. Mr. C. J. H. Woodbury, Impactor, Factory Muntal Fire Insurance Companies, Boston, lass just published as work, princed pl. join Wiley & Sons, New York, on the Fire Protection of Mills. A portion of the Look is devoted as a discussion of electric lighting in factories, quite and lobescription leing given of the Edition vascus. That subject is tractor from a standapoint of fair and intelligent criticism on electric lighting as regards askip from fire, and the book is therefore as whome contrilation to the growing literature on that subject.

AMMERRDAM, HOLLAND. A CAPÉ LUHETED. A plant of 60 Alaups was sarred July 7th, in the gandt calls of Masses. Krasuspolsky and Company, Amsterdam. This restaurant is one of the form of the

APPLETON, WISCONSIN. MILLS TO BE LIGHTED. A plant of 350 lights has been ordered by Mr. II. J. Rogers, Appleton, to light several mills in that city, the dynamos to be run by water power.

OHILL FLOUR MILL LIGHTED. A plant consisting of one E dynamo and 30 H Imps late leven installed near Valpazako, in the flour mill of Mr. Enrique Lana, the largest establishment of the kind in Calik. With 30 Imps in circuit, the water consumption is said to indicate less than two losses power, at a speed of 1,520 resolutions, they revolutions per minute; and with a speed of 1,520 resolutions, they

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say, they get 40 kmips at full 8-ramille power. The length of the circuit is 510 feet. The neachine runs 13 hours each day, and is in charge of an intelligent native miller.

HOLYOKE, MASS. THE OERMANIA PLANT. The plant in the Germania Milk, Holyoke, Misses, mentioned in the last Bolledin, was visited August Jul, by a large number of manufactures of cetton goods and paper, whose milks are in the neighboulesed. Requests of the visit were published in the Holyoke Transcrept, and the Springsheld Angle Cimon. The Interrupter says:

The graph party war amount in the capture of a silication at the capture of the capture of a silication at the capture of the

The following extract is from the Transcript:

"The Germana Mills have adopted the Edison meandrscent system of electric light, for their carding and spinning rooms and the apparatus has been adjusted and tested this week. Considerable interest has been awakened on this new illuminant, among the local manufacturers, suce the Edison company placed case of their plants in the Linke Hampsten, or the Merrick mill No. 3 places one or oreal patients to me those companies and have been closely watched and its success led to its adoption by the Germania company after careful investigation of the various systems of electric lighting room is at present lighted with lamps of 16 randle power each, and though less than half as many are used as there were of gas lights previously, the room appears searly as light as day and the temperature scarcely higher then in the open air, and the atmosphere as free from vitiation as though the room was illuminated by the rays of the sun. * * It is claimed that the Edison is the only electric lighting system that has never caused a free. The light crafted from these lamps is soft, pure and absolutely steady, burning in a draught, or a motionless atmosphere, without the slightest fluctuation, far excelling gas in all of these qualities and radiating, it is claimed, less than one officentle of the heat. * * At the Germania mill the system is thus for giving the

highest satisfaction and it is probable that the whole mill will soon be lighted by this method."

DAVERPORT, IOWA. A NEWSPAPER PLANT. The Davenport Garette Company has ordered a plant of 120. B lights for use in connection with the lasticus or the Company, to light the composing-room of the Gazzia, and to light the post-office. The plant will be installed at once.

CINCINNATI. A FACTORY PLANT. Mesors, James L. Haven & Company, manufacturers of hardware and agricultural implements. Cincinnati, Ohio, have ordered an I. dynamo with 86 A and 64 B lamps, to light a portion of their work. The plant will be installed at ource.

DANGER FROM GAS. Mr. William Crookes, F. R. S., London, says that with the use of gas "the ceilings get blackened, the curtains are soiled with soot and smoke, the decorative panti-work is destroyed, the gildings tarnished, the bindings of the leoks rotted, and the air of the room is not cool and fresh, but vitiated by the hot finnes from burnt or semi-burnt gas," * * * The London Times, July 8th, reports that the base of a big gas lamp at the bottom of Preston New-Road, Blackburn, blew up July 7th, with a loud report. The lamp leaked and exploded when it was lighted. Surrounding buildings were slinken, and linge stones harled thirty feet into the air. Mr. Whittaker was killed, Mr. Beardsworth and Mr. John Fielding were dangerously injured, and others passing by were slightly injured. This gas lamp had been set up to compete with the electric light. * * * The President of the Royal Society in his evidence before the Parliamentary Committee, at London, law recently stated that he likes the electric light because it saves his fixtures and books from disfigurement and does not beford the atmosphere. * * * A gas explosion took place in a cafe in Paris. July 12th, killing over twelve persons

and wounding nearly fifty, including a commissaire of police, a captain of the firemen, 17 firemen of the rank and file, and several sargents de ville. Early in the morning an escape of gas was noticed followed by a slight explosion. The proprietor of the cafe, where it took place, instantly started to have the matter attended to. Hardly had he gone when a terrific explosion occurred in the cellar, blowing the whole of the building to atoms. * * * Mr. Liriswold, the Timer says, thinks the fire, August 16th, in his hotel at No. 10 Thirtieth street, New York City, was caused by gas leakage. C. D. Miller was found, July 6th, in a dying state on his heal in the Cosmopolitan Hotel, New York City, suffering from asphyxia caused by inhaling gas and the gas was found turned on. * * * Mr. Wright. receiving teller of the Mechanics National Bank, Wall Street, New York, was knocked down and burned on the face and hands, August 3rd, by an explosion of gas which had escaped and lifted the spaces between the doors of the bank vault which Mr. Wright was opening with a caudle in his hands * * * William Henry Preces, F. R. S., in an article on the "Age of Electricity," published in the May number of Time, London, speaks as follows of the objections to gas:

"The objections to gas are very serious. In the very act of producing light it also produces water, and this water is found of great detrinent to delicate objects that are exposed in shop windows. It not only produces much heat itself, but it throws into circulation the heated products of combustion it also produces various gaseous acids which act injuriosely upon gilded ornaments, and the ornamental bindings of our books and picture frames, and which are stilly detrimental to the air we breatle. It hastens the decay of many materials, and its influence on brass is well known in the frequent falling of pictures when they are hong by means of brass wire. Again, sta fafolices or variation is desiractive to the eyes, so that constant writing, readmg or studying by its means has proved injurious; in fact, it is questionable whether it has not led more to short-lightedness than any other known cause. it, moreover, introduces into our longes a certain source of danger, taps are left unturned, meters get out of seder, gas e-capes into our rooms, and when it makes with air in certain proportions it produces one of the unst explosive agencies known, and wrecked houses and lost fives witness to this unfavorable side of the use of gus."

ANAMOSA, IOWA. STATE PRISON PLANT. A plant consisting of 1.0 lamps is being installed in the Iowa State Prison it Anamost,

MILAN. OENTRAL STATION PLANT. The Italian symbicate controlling the Edison light for Italy has purchased ground for the first central station in Milan. The property, for which the syndicate paid 300,000 francs, consists of a building known as the Theatre of Sa. Radegomb. The main hall, where the steam dynamos will be placed, is a room 140 x 45 feet. The City Government of Milan ltave already granted to the Edison syndicate the right of way through the streets, and underground conductors connecting the central station with the buildings of consumers will he laid at once. The most important places first to be lighted are the theatre La Scala, where 1,000 lamps will be used to illuming the stage alone; and the shops of the Galleria Vittorio Emanuele. Professor Colombo, of the Royal Polytechnic School of Milan, and the Technical Director of the Edison Italian symbolic is now in New York City supervising the shipment of the central station plant to Milan. Three steam dynamos, the same as are used in the Pearl Street station, New York City, have already been shipped, and the rest of the equipment is being forwarded as rapidly as possible.

PHILADELPHIA PROPORED INDIGO BALLWAY IN PAIRMOUNT PAIN. The following curret is taken from the report of Superintendent Thayer to the Fairmount Park Commission, Jone 27th, in response to the instructions of the Commission direcing Mr. Thayer to implie into and Teyer in goot the principality of construcing and opening an Edison Electric Raffway in West Fairmount Park. The following central is taken from the report is

"In order to assure myself of the practicability of the proposition which has been presented for your consideration I visited Mr. Edison's works, at Menlo Park, and carefully inspected the electric road which he has in opera-

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the state of the s

tion at that place, and which is 23% miles in length. As a description of this remarkable adaptation of recent discoveries in electricity to a useful purpose, may be of some interest in this connection, and as I was directed to report open the practicability of the matter, I will endeavor to explain it briefly. The motive plant consists of a steam engine, of 100 horse power, and 5 dynamo electric machines, capable of generating corrents of great quantity but very low intensity. These machines are placed in a building, at Menlo Park, and are connected with the rails of an ordinary railway trark about half a mile from the works by an insulated copper cable laid under ground. The power developed by the stationary steam engine pure in motion the armatures of the dynamos above referred to, and the rapid revolution of the armature in the fields' of the large electro-magnets develops the currents, which being taken from the vommutator by brudes suitably arranged, are transmitted from thence by the cable to the rails of the track. By this means the energy originally developed by the combination of the coal under the boilers of the steam engines is transmitted to a distance and placed in the rails of the track. It now simply remains to reconvert this energy isto meful work and to cause the cars to move. This is accomplished in the most simple namer by a reversal of a portion of the operation as follows: A dynaelectric machine is placed under the car and is connected electrically with the wheels. The current passes from the rails of the track to the wheels of the car, from thence to the dynamos. The associate of the latter is thus at once put in rapid motion, and by a simple and efficient sechanical arrangement the motion thus developed is transmitted to the wheels, which serve as drivers, and the ear is projetled along the track at any rate of speed that may be desired, depending simply upon the horse power of the dynamo engines used. The practicability of the matter, as far as the power proposed to be used is concroned, is thus seen to be assured."

ROCHESTER. SMALL PLANT ORDERED. A plant consisting of one E dynamo, 15 A lamps, to be in operation by Septemher 1st, has been ordered by the Eastman Dry Plate Company, Rochester, N. V. This company manufactures dry plates for photographers, and uses chemicals of an explosive nature rendering gas or oil lamps dangerous. The use of the Edison lamp will avoid this danger.

POTTSTOWN, PLANT FOR THE IRON COMPANY. The Pottstown Iron Company, Pottstown, Pa., has ordered a plant of one Z dynamo and 60 A lamps. The paths and roads around their

shops will be lighted with 30 of these lamps, about 10 will be placed in the offices, and the remainder will be placed in two dwellings, situated about 1,400 feet away from the dynamo, the wires being run on poles.

LAWRENCE, MASS. AN EDISON COMPANY FORMED. A company has been formed to introduce the Edison light into Lawrence. The officers of the company are F. E. Clarke, President; E. H. Lord, Secretary; and James H. Eaton, Treasurer,

LUDINGTON, MICH. SAW MILL LIGHTED. Mr. O. N. Taylor has ordered an E dynamo of 26 lamps tonly 13 to be burned at a time) to be installed in his saw mill at Ladington,

DANTZIC, PRUSSIA. NAVY YARD PLANT. Contracts have been signed to light a portion of the Navy Vard at Dantzic, the lights to be in operation by October first.

HOLYOKE. PAPER MILL PLANT. The Whiting Paper Company, mill No. 2, Holroke, Mass, one of the largest paper mills in the country, have ordered a plant consisting of one Z. dynamo and 120 B lumps. The dynamo will be run on an indeperulent engine, and the plant will be installed at once.

MANCHESTER, ENGLAND. THE IRONWORKS AGAIN. The following account of the plant, mentioned in the Eleventh Bulletin, now running in the Salford Ironworks, Mesors, Mather & Platt, Manchester, England, is taken from the Manchester Guar-

"The electricity is induced from two dynamo-electrical machines, each of 60-light power and driven by a small single-cylinder engine of six nominal horse power. The conductors are carried from the dynamos, which are placed on the ground floor, through two workshops containing all kinds of engine

BRAZILIAN PATENT LAWS. The Arm, Rio de Janeiro, June 11th, contains an article on the present attande of the Brazilian Government towards clearing flag paratus. The Legislature is at present indisposed to great protection to electric fight inventions, consequently the Efficion electric flag yearen cannot yeb et exploited in Brazil without imperfilling the pattern applied for. The following extracts are taken from the article in the Arm;

"The success which is attending the use of the electric light in various suntries leads once more to the pertinent in-pury: When is Brazil to open technicies tears once more to me periment inspury a south is assumed to specific done to this beneficial invention? **** Describbe as a new law certainly is, there is little or no probability of its adoption for a long time, and in the meantime it is proposed to deny privileges to this invention and to deny its use to the then it is proposed action, process to forbeit his rights of exclusive property in it. If we assume that the re-triction is right, then it is most unformulate both for the inventor and for the people that it is enforced just at this time and in conmeetion with this improvement, ••• The invention is now outside the realm of experiment; it is a proved success, a recognized improvement of incalculable value in the daily life of the world. And yet, the people of Brazil are isked to wait mild their legislators can frame a new law before they can take advantage of it? No government nor interest has any right to stand in the way of progress, nor to deny to a people the benefits grawing out of any discovery or invention, whatever it may be. That, however, is just the position occupied by the present national legislature of this country."

BRAZIL. PAMPHLET ON THE EDISON SYSTEM. The Engineering Clult of Rio de Janeiro, have published in Portugues a pamphlet of eighty jurges on the Edison System of Rective il Ilmaination. It contains among other things the report and opinion on

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the Eilem system made by the Commission appointed by the President of the Comed. in session January and 1882, composed of the associate engineers. Messes. Asna D. de Carrallo Reis, Ivan Raymundo Duerte and Joed America dos Suntos. The description of the Eilem Ight is accurate and complete and shows a just appreciation of its merits. Capses of the jumphic will be firmfished

GINGINNATI. A DISTILLERY PLANT. The Mil Creek Disbilling Company of Cincinuit, Offic, have ordered a Zdynama- and 6-5 A lamps. They have never been uble to use ony artificial be at in the room where re-distilling is done, because the alcoholic captor takes free and explodes. The Edison hamps to be used in this room will be enclosed in a glass globe of water, a little larger than the lamp itself, thus avoiding that adaptas.

PARIS, FRANCE. DRY GOODS STORE PLANT. The well known dry goods store. An Hon Marché, Paris, is non heing sured for 500. Elibon lamps. The proprierers, M.M. Boncicanh et Fils, have tried with dissatisfaction the an lights, and have discarded them to tre the Edhom.

EDISON LIGHT FIXTURES FOR HOUSES. A LARGE FAC-TON BOOTHS. The manufacturing of house fixtures and applantees for the Edison light tas rapidly steed-oped into a large lusiones. Messes, Berguman & Company, mentioned in the loss Bulletin, are a present foremost in this new enterprice. Finding their present shops, No. 108 Wester Street, too small to keep pace with their orders, they have just purchased the large factory of the United States Electric Light Company, located at the corner of arenne II and east 17th street, together with the entire plant of bidder, origing, shaffing, ext. The families, echlorative quipped TESTIMONIAL PROM W. H. PREECE. Mr. W. H. Preece, F. R. S., the engages of the British Board Tekgraph, and Commissioner of the Daglish Government at the Paris Electrical Exposition, has written the following letter to Mr. Arnold White, Sectory of the Edison Company, London, regarding the plan installed in the House of Assembly, Cape Town, Cape of Good Hope, mentioned in the Twelfth Bulletin;

"share Stati-Von are notice that the Cape footnement decision upon applying the decisite fails to their lines of a footnetile, and after an insuccessful trial of the are voten, they instructed of the control of the c

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Yours faithfully, W. H. PREFCE." NEW YORK CHTY. ANOTHER PLANT FOR MR. EVERETY. The Hotel Exercit 50 Childma Street, has been lighted for several months with a plant of about 100 lights, as was stated in the Fifth folicien. The light has given such satisfaction that Mr. Everett has given an order for a much haper plant, two. I dynamos and 230 A lamps, together with a few 32-cmdle hamps for out-door illumination, to be incultible in Everett 1 lond, Veey and Herley Streets. The front of the Hotel Everett has been lighted with two street hamps composed of choices of Edition to Cambe lumps to the out-door hamps for Everett's Hotel, to be placed in globes attached to hamp posts under 60 the purpose, are to be of 32-cmdle power, and are to be so arranged as to light the sidewalk in front of the hotel. The interior lamps, to-found for power, will be distributed in the halfs, odices, drining forom, parlows, and elsewhere on the first four of the hotel, to the continuous parlows, and elsewhere on the first four of the halfs, odices, drining forom, parlows, and elsewhere on the first four of the halfs,

ST. PETERSBURGH, RUSSIA. RESTAURANT PLANT. A contract has just been concluded to light the Restaurant Dejenne of St. Petersburgh with a plant consisting of 3 Z dynamov and 180 A lamps.

EDISON FACTORY IN FRANCE. Origin to the first that under the French patent have, haups, dynamos, meters, and all other apparatus, constituting the Edison system and covered by Edison's French patents, must be manufactured in France, there has necessarily been some dealy in starting our light in that commity, petuding the equipment and starting of factories. The European enguings factory at Irsynar-celone, however, it some distincted, and Mr. Matchelor has commenced to turn out dynamos, lamps, etc. Consequently the Preach Company has now league in itstall plants in Paris, as well as chewthere in France. The following account of the factory is taken from the Lundon Edizories, August 14th:

"The Edison Company have now completed the establishment of a lactory for the manufacture of their dynamos, lamps, &c., in Paris, Owing to tory for the manufacture of men nymamos, samps, exc., in cars. coming to the laws of the country it was absolutely necessary to establish a factory where everything appertaining to the system could be manufactured, as if any foreveryoning appearating we not special sold, the patients obtained for it become cold in that country. This obstacle to the introduction of the Edwar system has now, however, been surmounted, and we are informed that several plants are being laid down in different parts of the rountry. The factory, as established, consists of three principal departments: First, the machine works, where the dynamo machines, resistance lones for the regulation of the magnetic field, together with all the necessary lamp frames are made. Second, the lamp factory, which consists of the glass department, where all the glass parts of the lamp is made; the fibre room, where the fibres are cut and finished, which when carbonized make the earlysis for the lamp; the clamp room, ed, was now in the composition of the plating where the clamps which hold the earlous in the lamp are made; the plating nean, where the carbons are plated on to the clamp, so as to insure good connear; the pump room, where the air is echanisted from the globes; and lastly, the testing room, where all lamps are lested and marked. Third, the electric tube works, where all the underground mains are made, together with the into works, untere an one moverground beauty are minor, possess own one inaction boxes, safety boxes, &c. The lump tretory at present has a requesty for turning out 1,000 lamps per day. There are over 500 men employed at the works. Mr. Batchelor is manager, and is assisted in the machine works by Mr. D. Cunningham, who was susser mechanic at the Elison machine

BUDA PESTH, HUNGARY. POST OFFICE LIGHTED. The post office and telegraph authorities at Blada Peath have expressed tenseries as a statistical of the discharged and the factor and the becamming all sight for three months without giving any trouble. Pervious to adopting our light they had tried other electric lights but without success. They state they will make our plant permanent.

RIO DE JANETRO. The Dour Pedro Railway Station has been lighted for several months with one of our plants. The illumination was recently inspected by the Emperor of Beazil, and the following account of his visit is taken from the Globe, Rio the Janetro:

"Night before last the promised exhibition of the Elfon system of electric light took place at the Dom Pedro Railway Station. There were present the

Emperor, the Princess Imperial, the Minister of Agriculture, Count Hapendy, Counsellor Leitau da Cunha, and many others. The Emperor and suite array. ed at the Station at 8.30 P. M., and were received by Dr. Herculano Penna, director of the railway, Mr. Rademaker, chief of trattic, Dr. Aarao Reis, chief of telegraphic service, Mesors. Robinson and Libra, Connsellor Galvao, inspector of public lights, the committee of the Unit of Engineers, and other citizens and public functionaries interested in the experiments, which were conducted on the extensive platforms of the station, under the direction of Dr. Reis and of C. H. McCarty, the representatives of Mr. Edison. Experiments were made with the Elison light first, then with gas, the Elison Company using 56 whole lamps and a half lamps, which, since the 10th, of Februry have be nonsly lighted 675 hours. The electric current was generated by the dynamo which was sent out by Mr. Edison for exhibition at the Brazilian Industrial Exposition. * * The superiority of the follown light was generally recognized, particularly by the Enqueror Mr. McCarty, to show the insulation of the flame and the absort entire freedom from risk of fire, broke one of the glasses while wrapped in a piece of cambric. This light texture was unhurt notwithstanding its proximity to the flame. The experiments terminated at 9:40. The Central Station will continue to be lighted until next Sunday with the same lamps. At the close of the exhibition, Dr. Reis presented the Count d' Eu with a box containing all the apparatus for postucing the Edwar light."

MR. EDISON'S PATENTS. The Cond Sixts Panel Office official Genery, Volume 2; July to December, 1981, just published, shows that within the six mouths covered by the volume of the General, 96 justust were issued for different forms of electric lights, including the are light, dyramous, lamps, meters, Ac, and that 18 of these patents, being one half of the total number issued, were granted to Mr. Edison.

NEW ENOLAND DEPARTMENT FOR THE EDISON LIGHT. The rapid increase of our hosiness in New England has compiled us to form a spearare department for that territory, consisting of all of New England except that portion of Connectivit type west of the Connectivit type. W. Spencer Horison, Treasure and Superintensient of the Fall River Bioschery, has resigned his position in the Blackhery to a accept the position of General Manager, at Broads of this New England Department of the Edison Electric Light Connectivity of the Edison Electric Light Connectivity of the Connectivity of the Edison Electric Light Connectivity o

As a conclusion of the Section Matters, and the Section Matters of t

WILLIMANTIC LINEN COMPANY, FLANT ORDERED,
The Willinmantic Linen Company, Willinmanic, Conn., have writered a
plant coasisting of use Z dynamo and 60 A lamps to light one of the
rooms of one of their mills, for the purpose of making a practical lest
of the Edison lamp for their work.

PHILADELPHIA. THE LEDGER PLANT AGAIN. Our plant in the composing nones of the Lodger has proved so satisfactory that the larges have been introduced also in their publication office, which was lighted for the first time with the Edison light, July 12th. The Lodger of July 14th, contains the following account of our plan:

21

"The Eileon retoric light, which are, introduced into the composing count of the Thru LEARS on May proof to the Confederacy that is the learn exceeded to the publication office, where the viscosity of it is natural second of the Confederacy in the Confederacy of the Confederacy of the Confederacy of the Confederacy of the composing rows that even is confined used to strately the confederacy of the composing rows that even is optimized to the confederacy of the present composing rows that even is optimized to the Confederacy of the conversion public public control of the Confederacy of the translations of the operator public in its consideracy with a system of shops the Confederacy of the

In the publication office, as in the composing room, each gaslight formerly in use has now its corresponding electric lamp of what is nominally the same candle power. The gas features remain in position subject to use. For the publication office chandeliers have been specially designed by the Superintendent of Machinery to meet both the requirements of the insurance companies as to the laying of electric wires and the requirements of the Lays, an office. There are three gas chandeliers of six lights each, hung from a criffing panelled in hard woods. The conducting wires were carried on the celling so as to be connealed from view, and, as they could not be carried down on the gas chandeliers, under the Insurance regulations, burnished beass drops were made, encircling the chandeliers and stayed to them by ornamental wooden clamps, about two and a half inches in length. Each of the three drops carries within it the wires for two lamps, which branch out from the between the gas jets and increase the diameter of the chandelier about six makes. The lamps, is to rach chandefier, hang downward, and have above them that white glass studes or reflectors. The cashier's, checks' and beokrepers' lights are arranged on brackets and stands similar to the gas fixtures heretofore used by them. and a movable desk light, supplied by gas through desible hose, is matched by a murable electric lamp, supplied with electricity through a wire cable.

"we allowed excite. Intips, supplied with electric by though, a wire colds," and the cold of the cold

The two 60-lamp dynamo machines now in use are to be replaced in a short time by a 250-light machine, which has been delivered and will be set

. .

LIFE OF LAMPS. The life of our lamps can best be estimated in cases where a fixed number are lighted and extinguished together; a record being kept of the time of burning and of the number of breakages, and broken lamps as fast as they give out being replaced by other ones. The rule for finding the life is to multiply the hours the lamps burn by the number of lamps and divide by the number of breakages. The life depends upon the candle power at which the lamp is burned. Thus if a B lamp (eight candles) is placed on a circuit for an A lamp (sixteen candles), the B lamp will be intensely brilliant but it may last only a few seconds. If, on the contrary, an A lamp is placed in a B lamp circuit, the former will hardly glow and it will last forever. From this it will be seen that the life of the lamp depends on the candle nower it is made to give. But there is another item to be considered, namely, the number of lamps per horse power. If an A lamp current is used upon a B lamp, the quantity of current sufficient to supply three A lamps, or give forty-eight candles, would bring the B lamp up to 600 candles; more than twelve times as much light as is obtainable from the same unit of current in connection with the three A lamps, and equivalent to about fourneen hundred candles per indicated horse power. But in that case there would be a vast difference in the life of the lamps. The three A lamps would last, while the B lamp would die in a few seconds. As regards a B lamp current, if an A lamp is placed in a B lamp circuit, the result would also be very uneconomical. With the power that would be sufficient for one third of a B lamp, or in other words to illumine a B lamp to a brightness of three candles, the A lamp would give

only about one fortieth of a candle, which would be equal to only one candle per horse power, but the A lamp would last for years. Between these extremes, Mr. Edison has chosen a mean, so as to give the consumer the most economical lamp. This was attained by the study of a vast amount of data obtained by experiments with many thousand lamps extending over many months, The number of lights of sixteen candles each that can be obtained for a horse power of electricity, (provided the energy or power furnished to run the dynamic is entirely steady), it shown below in the column marked I, while the hours that these lamps will last is shown in column II.

1	- 10
133/2 per 11.	42 hours
812	2,240 **
5,55	 35,cm "
1 0 0	 Practically permanent

By estimating the cost of lighting a room with z - hamps for 1,000 hours, it will be seen if the estimate is made on each of the four conditions allowe given, that Mr. Edison has struck upon a wise mean between two extremes. For the purposes of the estimate, power may be taken at one cent an hour, and the cost of the lamps may be assumed to be one dollar each, there being moreover no difference between the cost of an A and B lanus

Taking lamps	at 1334	per l	I. P.	
Power costs				\$ 14 81
Lamps cost				- 476 19
				401 00
Taking lamps a	u 834 1	er H.	P.	1,,, 00
Power costs				\$ 23 53
Lamps cost				. 8 93
				32 46
		(171)		-

No. 14.

Taking lamps at 535 per H. P.

Power costs Lamps cost

57 51

Taking lamps at 1 per H. P. Power costs

\$200 co

These tables show the need of regulating lamps carefully, in order to obtain the best results both of life and of economy of power; and the practical instruction to be drawn from them may be summed up as follows: First, if a consumer desires an increased quantity of light, it is cheaper to add more lamps than to force lamps to an increased incandescence; second, if power is cheap, lower economy lamps can be used, that is to say laups requiring a larger quantity of horse power, than when power is dear; third, if power is so cheap as to cost almost nothing, as in the case of some water power, an A lamp may be made, which, at one lamp per horse power, would last forever: and, fourth, while it is true that a few lamps per horse power last longer (thereby economizing in lamps at the expense of horse power), and that many lamps per horse power last shorter (thereby economizing in power at the expense of the lamps), it must be remembered that the important thing is to strike the happy mean, namely, the longest possible life with the least possible consumption of power and investment. It is this which Mr. Edison alone has accomplished.

FOURTEENTH BULLETIN.

The Edison Electric Light Company

(These bulletins, originally issued as a convarient way of asswering the inquiries of the converse of the property of the converse of the property of the Company and of other natires of greater or less interest consected with electric lighting. Agents are particularly represent to communicate to the Vive President whateve practical points of general interest may be developed by their experience in finalling or operating our judge.

New York, October 14th, 1882.

TERT DISPIRIOT, NEW YORK OITY. This playme was started and distorter lighted up for the first time at 3 Jr. 31. September with Since them the station has been ramming day and ingle without stopping. The statement was made in the last find last mere now. Induced, we can go further and say, that as regards Nit. Elbons's part of the work, manufor, the electric apparaism and every thing appearaisming thereto, the result have exceeded our muticipations, the only delay data we have had having been carested by purely mechanical matters, such as the regulation of engines, and other annual engineering amonyance incidental to sarring for the first time a number of high-speed engines. We are as present lighting 58 chones, wird for 3,133 lanus, and as soon a certain adjustment now being made in the stems engines are completed, we shall connect other houses a fix as possible.

Predictions have been made by parties unacquainted with the details of the Elifson system, that the attempt to send electric currents by means of understoomed convocate har gave covered by our First District would dilit. On anonymous corresponding, the letter published recently in the data our underground conductors had been proved a failure. The data our underground conductors had actually proved a failure. The converse of the process was published appear and commenced upon generally by the process was published in the duration that Light formats. New York City, Choober 2d, and its as follows:

"Washington, D. C., September 27th, 1882. To the Emior American Gas Light Journal of

Thinking the full adapt may be true, that you have top from himse trans the news, I be to acquain to a work I be activated to a second to the contract of the property of the

Very respectfully, X.**

The correspondent (name not given) says his informant was an electrical inventor (name not given), who obtained his information from another electrican (name not given). Is there any truth in it? Note. Note electrican was ever summoned, none ever came, we never thought of lighting even half of 2,500 houses, more than 50 houses are lighted, the electricity is not conveyed away owing to imperent insulation, the underground conductors are not a failure, and Nr. Zdison insued of lesing disappointed with them is even heleter astafed than he ever expected to be. Such are the facts briefly sated. As to finantialism in general, the evel of leakage is greatly ex-

aggerated. Ordinary insulation is good enough, provided the materials do not deteriorate with exposure to moisture and air. This subject was fully treated by Mr. Clarke, in his report on underground conductors and insulation, to the Judiciary Committee of the Khode Island Senate, printed in the Eighth Bulletin.

As to insulation in our First District, the total net-work of conductors is over 79,000 feet. They were manufactured in lengths of 20 feet, and each length was rejected that did not, on cureful test, show a resistance of at least 150,000,000 olms. Applying the same test to the entire net-work as was thus applied to each length of 20 feet, equally perfect resistance would be about 37,974 oluns; and the total leakage in the entire net-work about 141 foot lbs per minute, or .00427 of one H. P. 'The conductors have now been under ground, on an average, mine months, and have been in constant use about 40 days. Our tests show that their efficiency as regards insulation is but a trifle below the theoretical efficiency exacted from each length tested as above, and that the loss of current, when the First District is in operation at the maximum, will be equivalent only to seven-thousandths of one lamp, or, in other words, to 48-millionths of one per cent. This loss from leakage is so insignificant that were we to light the entire city of New York with, say, four hundred thousand lamps, the whole lose of current from leakage (taking the actual results in the First District as a basis) would hardly amount to enough current to run a single lamp.

From the above statement it will be seen not only that the evil of leakage in general is greatly exaggerated, by inexperienced electricians, but also that the extent to which we suffer from that evil in our First District is infinitesimal.

THE YACHT NAMOUNA. The plant on Mr. Bennett's yacht, Namouna, was highly complimented in the New York Herald, September 8th. The article states that the lights "were in constant

use during a crube from New York to the Canary Islands, Madeira, Glindlar, Algiers, Palermo, Malta, Constantinople, Alexandria and Hindisis, eccuping in all upwards of two months time," and that "for continuous lumning, freedom from flickering, absence of heat and olor, and for practical working and ease in handling they proved entirely substicency.

THE EDISON LIGHT IN THE TELEGRAPH OFFICE, LONDON. We quote below an extract taken from the London Times of August 224, giving an account of the installation of the Edison light in the "Press Department" of the Telegraph office:

"Last night there was an important distallation of the Edison electric light in the "Press Department" of the telegraph office, St. Martin's Le Grand, and the work thus carried out solves what have hitherto been considered some difficult problems in the spession of electric lighting. The first interesting fact is that the lighting is part of a "system" sopplied at a distance from the place lighted, the Edison Electric Light Company having its centre on Holliom Viaduct. The extension to the top room of the General Post Office, which was accomplished last night, is the greatest yet made from that centre, the distance from the dynamo-room of the company's office to the "Press Room" of the General Post Office being 1,050 feet. * * * The "Press Room" to which the Edison electric light has thus been supplied is a very besy part of the telegraph department (1,200 persons being employed therely which occupies the whole upper floor of the western building in St. Martin's Le Grand. The luildings, in fact, are lives of industry night and day. The post office authorities have long been alive to the necessity of replacing gas by electricity, and have tried more than one so-called "system". The proved danger of fire from one, and inconvenience arising from the sity of having a special engine in another, with other practical difficulties proved in the working, led to their discontinuance. the advice of Mr. Procee, the electrical engineer of the post office, the Edison system was attached, and last night commenced its working. The first lighting was soon after 8 o'clock, and when the gas in the press room was eatinguished a turn of the switch lighted up 59 incandescent lamps, of the well known pear-shaped pattern, with the earlien of the shape of an elongated horse-shoe. The effect of the change was very marked. In the telegraph room the atmosphere was heavy and heated. In the room lighted by the Edison lamps an even light without any shadow was thrown over all the tables, while the atmosphere, previously heated by gas, sensibly diminished, even in the short space of about 20 minutes."

ADISON MORT DY A RAILWAY STATION AT PARIS. A plant of 160 A lump is intuited in the St. Lazare Station, at Paris, of the Western Railway of France, and loss been in successful operation for the past three weeks, giving great satisfaction to the Railway Company and to the public. The lights are distributed in the waiting rooms and in one of the principal passesse. This experimental installation is made by the Western Railway Company with a view to the introduction of the light in all the stations of the Company.

CONTRACTS CLOSED BY THE WESTERN EDISON LIGHT COMPANY AT OHIOAGO. The following orders for isolated plants have been taken by the Western Edison Light Company:

- (1). A plant consisting of a L dynamos and 310 A lamps for Messrs, C. W. & E. Pardridge & Co. The light is to be used in two dry goods stores on State Street, Chicago, one-ching known as Pardridges, and the other as the Boston Store.
- (2). A plant consisting of one K dynamo and 150 A lamps for Mr. H. D. Smith, Appleton, Wisconsin, to be used for the purpose of lighting the residences of Mr. H. D. Smith and of Mr. A. I. Smith; also the Appleton Blass Furnace, A. W. Patten's Paper Mill, Fleming's Linen Mill, and the Appleton Woolen Mill.
- (3). A plant consisting of t E dynamo and t5 A lamps, to be installed in the Norton Flouring Mills, owned by Norton, Brother & Co., and located at Madison Street Bridge, Chicago.
- (4.) A plant consisting of 506 lamps in the Empire Brewery, Best Brewing Company of Milwaukee, Wisconsin.
- (5). A plant of one K dynamo for the North Western Manufacturing and Car Company, thereby doubling their present plant.
- (6.) A plant of one Z dynamo and 60 A lamps for the saw mill of Messrs. Butters, Peters & Co., Tallman, Michigan.

(477)

TESTIMONIAL FROM BUDA PESTH. We have received the following testimonial from Buda Pesth, relating to the budding occupied by the Minister of Post and Telegraphs:

I, the mirespect, certify page — (West Dexts, July) and to SSA, the work experiment in SI, first an indicate and the second to the second to the second to the second to the second the second the second to the sec

mons approbation of the direction and of all the employees.

LOUIS KOLLER,

Ministerial Counsellor and Director in chief of the Department of Telegraphs

STORAGE BATTERIES. The following letter, published in the New York Horald, September 23rd, 1882, is of interest:

"To the English or the Harappe-

hi an article entitled 'Electric Lighting,' published in your editorial columns, toth inst., referring to the use of the Faure accumulator, occurs this statement:—

Having once pumped the accommissive till, the running of the generating engine for an hour a day is all that is required to keep fifty lamps of sixteen canalle power in full operation for six hours.

No much littered is fell pell-up office in matter a chiefe, overeit is flow, that a statement on colculated in salacked should be corrected in more first dark in that a dynamic matchine capable for applying why shere caudion. The feet is that a dynamic matchine capable for applying why shere caudion of colculated in the contraction of the contraction of the damps a sufficient insules review bears, than showing a base of currye developed in high of about freely not been contracted in the contraction of the other traction in a contraction of the contraction of the other capable in the contraction of the contraction

exceed the time for which they are to be used in lighting. These are the costonies; but there are, nevertheless, many uses for the accumulator in places where aboun engines cannot be conveniently used, and where the cost per light is a matter of perfect indifference.

C. GODDARD,

Secretary Edison Electric Light Company,19

THREE MORE STEAMSHIP PLANTS. The following additional orders for steamship plants have just been received:

 A plant consisting of two K and one L dynamos and 802 A lamps has been ordered for the steamer Pagrim, of the Fall River line.

(21.—A plant consisting of one Z dynamo and 13. B lamps has been ordered for the steamer Albatross, United States. Fish Commis-

(3). The Bay Line Company, Baltimore, have ordered a plant of one Z dynamo and 120 Bamps for the Seamer Virgina, mining from Haltimore to Norfolk, Our plant already in no con the samer Carolina, which also runs from Baltimore to Norfolk, has given such satisfaction that the owners have decided to introduce the light also on the steamer Virginia.

BALTIMORE SUN. ANOTHER NEWSPAPER LIGHTED.

We have received an order from Messes, A. S. Abell & Co., Baltimore, for a plant of one L dynamo and 150 A lamps to light the offices and composing rooms of the Sun.

PIANO FACTORY PLANT. We have received an order from Mesers. William Knahe & Co. for a plant of one Z dynamo and 60 lamps, for their piano factory at Baltimore, Marcland.

LEHIGH VALLEY OAR SHOP PLANT. A plant of one L dynamo, 150 A lamps, has been ordered for the car shops of the

Lehigh Valley Railroad Company, Sayre, Penn.

DANGER FROM ELECTRIC WIRES. OURS ARE SAFE. In view of the discussion now going on is the local newspapers about the danger from electric light wires, it is well to hear in mind the difference between the Edison system and all others. All other dynamos than Mr. Edison's yield currents of very high potential or pressure, and hence the very greatest care is necessary in handling exposed portions of their circuits. Not a few fatal accidents have thus happened. With Mr. Edison's dynamo machine, even of the largest kind, such accidents are absolutely impossible. The reason for this is twofold: first, the electric pressure yielded by the machine is only 110 volts; and, secondly, owing to the fact that the resistance of the human body is very great (several thousand oluns), while the intensity of the Edison current is very small, only a small portion of the current in the Edison system, can traverse the body, even if the bare hands are placed on the principal mains. Accordingly, under no circumstances can a person by touching the Edison mants, get through him more than a small portion of a current of low potential; and there is for this reason absolute security to life. Mr. Edison's lights are everywhere run with this current of an intensity of only about 110 volts, whereas the arc lights require a current of about 20 times greater intensity, reaching in some cases to 2,400 volts. The difference between handling our conductors (charged with an intensity of 110 volts), and handling those of the arc lights (charged with 2,000 volts), is, to use a popular but inadequate illustration, about the same as between handling a metal of t to degrees temperature, and one heated to 2,000 degrees. But the arc light wires not only burn, they also main and kill. Mr. Erlison early foresaw this danger arising from the use of currents of high potential, and perfected his system accordingly, using a current of very low intensity. Consequently the Edison conductors are safe.

SIX MORE FACTORIES TO BE LIGHTED. We have received the following orders for factory mants:

- (t). The American Printing and Dye Works, Fall River, Mass., have ordered a plant consisting of one K dynamo and 250 A lamps.
- (2). The Alberton Cotton Mills, Elyville, Maryland, have given us an order for a plant to light their mills consisting of one K dynamo and 250 A James.
- (3). We have received an order from the Amory Manufacturing Company, Mauchester, N. H., for a plant consisting of one K dynamo and 250 A lamus to light their cotton mill.
- (4). Messrs, G. P. Ide, Bruce & Co., Troy, N. Y., have ordered a plant of one L dynamo and 150 A lamps to light their shirt-collar
- and cuff factory.

 (5). We have received an order from the Matteawan Manufacturing Common Metassan N. N. S.
- turing Company, Matteawan, N. Y., for a plant consisting of one Z dynamo and 120 B lamps, to be used in lighting their hat factory. (6). Messrs, D. Goff & Sons, manufacturers of braid at Pawtucket.
- (6). Messis, D. Goff & Sons, manufacturers of braid at Pawtucket, R. L., have ordered a plant consisting of one Z dynamo and 60 A lamps for their factory.

TESTIMONIAL FROM BEATTY'S ORGAN FACTORY. We have received from Mr. Daniel F. Beatty the following testimonial:

"BEATTY'S ORGANS & PLANOS.

Office of DANIEL F. BEAPTY.

Washington, N. J., Sept. 13th, 1882. The Embow Electric Light Company, 65 Fifth Avg., New York.

Gentlement-I have used your light in up fairing with gent additions the in-statistics of the pitted ligh interpret [10] to the prevent time us have lead no treatile with at whatever, the two dyname with a feeling in thick for many phone as at line, and supplying too lamps with a feeling in tight. I am aware that yoo is above the number authorited by you, but the result has been very satisfactory thous for and so no useles leading of the nucleives have needed or the life of the tamps theretweel we are satisfact to run them laws recorded or the life of the tamps theretweel we are satisfact to run them.

the only limitations, speed achiefs for any mile. My factory has no area of factors ought error and a limitation for manufactured on the precision of factors ought error and all limitation for the contract of the contract

I trust that you will achieve great success in all directions.

Very truly yours,

DANIEL F. REATTY."

NEW YORK HERALD PLANT. This plant was started September 4th, and has been used nightly since. The average number of lamps burned all at once is 385, except Saturday nights when it is 460. The largest average number of lamps are used between midnight and z A. M., when the paper is being made up for press. The total number of lamps in the plant are 692, arranged as follows: press room 98, folding room 41, stereotype room 40, machine shop 9, Telegram office 7, counting room 51, library 60, office and private rooms 17, editorial rooms and office 47. Telegram composing and editorial rooms and Herald city editor's rooms 86. Herald composing rooms 196, sandry halls, closets, &c., 18, reflector used for lighting large news hulletin outside ("A" lamps of 32 C. P.) 13. There are also 9 lamps in the engine and boiler rooms in the Bennett Building. The boiler, engine and dynamos are located in the basement of the Bennett Building, corner of Ann and Nassau streets, the current being conducted to the Herald Building through 400 feet of Edison tubing, of which 350 feet is laid underground through Ann street. The boiler, made by Babcock & Wilcox, has a nominal capacity of 125 H. P.; the engine, made by Armington & Sims, and capable of developing 125 H. P., should the plant be hereafter increased, is now running at an average speed of 250 revolutions a minute, and the two Edison K dynamos, each with a capacity of 250

A simps, have the usual electro-motive force of 1 to volts. There is officient engine and boiler expectly to admit of doubling the number of finites, should it be deleted to do so at my finite time. The roller is located in a separate room from the engine pure with official power length gransmitted from the engine pure most of belting, a line shaft and counterialist; and either dynamo can be put in or of our five means of light and these palloys no consuchesfules, the dynamo being also connected in multiple are to the conducting lines, so that either one can be instantly thrown out. The lamps to light the large revolving bulletin used on the fourt portice of the Herald Bullding, displaces an are light and a special engine and dynamo formerly used for the purpose; and are found to be just what was wasted, for superior to the former method of lighting was wasted, for superior to the former method of lighting.

ANOTHER PLANT DOUBLED. The successors of Mesore Segmour, Salain & Co., (The North Western Manufacturing and Car Co.) have ordered their plant, mentioned in the Second Hulding, to be doubled. "They have been trying," Mr. Co. II. Ilies writes from Chicago, "Some are lights in a partion of their words without satisfaction, and have concluded to increase their incandoscent rather than their are light plane."

GINGINNATI. TANNERY LIGHTED. We have received an order from the American Oak Leather Company, Cincinnati, for a plant of one L dynamo and 150 Å lamos.

BOSTON. DRY GOODS STORE PLANT. A plant of one L dynamo, and 162 A lamps, is being installed in the rebil dry goods store of Neasts. Jordan, Marsh & Co., and will probably be started next week, at the time of their Autumn "opening."

EDISON'S UNITED STATES PATENTS. In the Sixth Bulletin we gave a list of patents relating to Electric Light issued in this

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country to Mr. Edison up to the end of the year 1881. Since that time 63 adhitional patents on the same subject have been issued to him; eighteen on August 22d, one on September 5th, thirty-one on Neptember 19th, one on October 3d, and 12 on October 10d, 1882. It is an interesting fact to note that the above issue of 3r patents is the largest number ever issued to one than at one time and on one subject in the whole himory of patent law. We give below and in other of the subject in the whole himory of patent is. We give below a list of these 63 patents. We also add a others for details of manufacture, &c., which have been granted to employees, and which law been assigned by them to us. All these patents, together with those unentioned in the Sixth Bulletin, and one which was then inadvertisely omitted, make a total of 1rg Diried States patents affected with those controlled on the Sixth Bulletin, and one which was then inadvertisely omitted, make a total of 1rg Diried States patents affected in an all belonging to this Company; beatter applications for 135 additional patents more perinding in the Patent Office.

MASES.		PUTE		THE W MINE
248,565	Ortol	er 18.	1881	Webstracter.*
263,133	Augus	st 22,	15000	
263,131		22		Dynamo or magneto-electric machine. Regulator for dynamo or magneto-electri- machines.
263,135		22.		Electric lamp.
263,136		92		Electric minp.
				Regulator for dynamo or magneto-electri
263.137		22.		
263,138		22,		Electric chamlelter.
263,139			:	Electric are light.
263,140		22,		Manufacture of carbons for electric lamps.
263,141		22,	••	Dynamo-electric machine
200,141		22,	**	Straightening earbons of electric incandescent
1				lamps.
263,142	**	22,		Electrical distribution system.
263, 143	**	22.		Magneto or dymmo-electric machine.
263,141	••	22.	1	Mold for earbonizing heandencests.
263,145	**	22.	!	Miking Incandescents.
263,146	**	22,	1	Danama incamingseents,
263,147		22		Dynamo or mugueto-electric machines.
63,148		22.		Vacaum apparetas.
				Dynamo or magneto-electric machine. on list m Sixth Bulletin.

				13
M MISR.	e de la constante de la consta	DATE		TITLE OF PATENT.
261,149	Angn	at 22,	1882	Commutator for dynamo or ungueto-elec-
263, 150	۱	22,		
261.878	Sept	. 6.		Magnets or dynamic-clottric machine.
264,612	Lop	19,		Electric distribution and translation system
264,613		19.		Magneto-electric machine.
261,615		19,		System of conductors for the distribution electricity.
261,616		19,		Dymano or amgaeto-electric marking.
261,617		19.	••	Dynamo or magneto-electric machine.
264,618		19.	**	Dynamo or amgneto-electric muchine
264,619	**	19.	••	Dynamo or magneto-electric marchine.
264,650		19,	••	Manufacture of incambosing electric lamps
261,651		19,	••	Inemalescent electric lamp.
261,652		10,	**	Incandescent electric lamp.
261,650	••	19,	**	Incandescent electric banus.
261,654	**	19,	••	Incandescent electric lamp.
264,655	••	19,	••	Inemplescent electric lamp.
261,656	••	19,	••	Incondescing electric lump.
261,657		19,	**	Incandescent electric horp.
264,658	**	19,	**	Regulator for dynamos electric machines.
264,659	**	19,	••	Regulator for dynamo-electric machines.
264,660	••	19,	••	Regulator for dynamo-electric machines
264,661	••	19,	**	Regulator for dymmo-electric machines.
264,662	**	19,	**	Regulator for dynamo-electric machines.
264,663	••	19,	••	Regulator for dynamo-electric machines.
264,661	**	19,	••	Regulatur for dymano-electric machines.
261,065	••	19,	**	Regulator for dymmo-electric muchines.
254,666		19,	••	Regulator for dynamo-electric machines.
264,667	"	19,	**	Regulator for dynamo-electric muchines.
264,668	**	19,		Regulator for dynamo-electric machines.
261,669	**	19,	••	Regulator for dymmo-electric machines.
264,670	*-	19,	**	itegulator for dymmo-electric muchines.
264,671	**	19,	**	Regulator for dynamo-electric machines.
261,672	"	19,	••	Regulator for dynamic electric machines.
264,673	"	19,	"	Regulator for dynamo-electric muchines.
261,698	••	19,	*	Electric ismp.
264,737	-"	19,		Incandescing electric lamp.
205,311	Oct.	3,		Electric imps and holders for same.
265,774		10,	.	Maintaining temperature in webermeters.
265,775	**	10,	**	Electric are light.

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BERAMON, PRANOZ. WATER FOWER USED. The Edison Company at Beaucon, have had an experimental plant of 1 Z dynam in sit ascessful operation since Speniher 1st. The dynamon are not by a water-power situated at a distance of 1,200 meters from the places lighted my, and the current it is sent through 1,100 meters of cable. These dynamon supply light for a tunnel through the mech, in which 27 A hamps are used, also to light a street, several private houses and stores, minut which are the Cell Granville with 3 A hamps, and the Maison Dubois with 37 A hamps. This plant is invalided with a view to the utilinate etablishment of a Central Sation, from which the whole town will be supplied with the Edison light; and a peculiar interest attacks to the plant from the fact of the use of hydraulic power situated nearly a mile from the second lighting.

THE OHIOAGO COMPANY START A BULLETIN. The Western Edison Light Company, Chicago, have started a Bulletin. The first number was issued Specienther 11th. It is a small pamphet modelled after this Bulletin, and is published for the information of

the stockholders in the Chicago Company. Stockholders in any of our Companies can doubtless chain copies by writing to the office of the Western company, Nos. 5t and 53 Wabash Avenne, Chicago.

LORRAINE MILL PLANT. In this plant the are lights will too be displaced, but will continue to be used in the old mill, while our light will be used in the new, so as to enable the proprietors to determine which is the better adapted for their business.

PERPIGNAN, FRANCE, LARGE PAPER FACTORY LIGHT-ED. A plant of 1 Z dynamo with 50 A and 58 B lamps is being installed in the paper factory of Messrs. Bardon et Fis.

87. OHAMAS, FRANCE. The Government powder manufactory is now lighted with an Edison plant. This installation has some special features. The wires are all oneside the instilling and all lamps are in recesses in the walls, with a pone of glass in from, there are not provided in the property of the prope

AN ORGAN FACTORY PLANT. The Bridgeport Organ Company, Bridgeport, Coun., have ordered a plant consisting of one K dynamo and 500 B lamps for use in their factory.

BUENOS AYRES. An Edison plant was started Angust 25th, in the Confiteria del Gas, and has been muning ever since with success. The light is used four hours every night, and the local newspapers are enthusiastic in praise of it.

A FLOUR MILL TO BE LIGHTED. Messrs George Urban & Co., Buffolo, N. Y., have ordered a plant consisting of one E dynamo and 15 A lamps for their flour mill.

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BOSTON, OUR EXHIBIT AT THE INSTITUTE PAIR. The exhibition of the Edison light announced in the last Bullenn to he made at the Manufacturers and Mechanics Institute Fair, is in operation. The installation and management of the plant has been under the charge of Mr. Snencer Borden, Manager of the New England Department of the Edison Company, who succeeded on short notice in having everything in readiness, so that when Mr. Edward Atkinson commenced his address at the opening of the Fair, on the morning of September 6th, the entire Edison exhibit was started, although it was daylight. Since then it has run continously with marked success. The plant consists of two K dynamos, driven from a countershaft by a Lawrence 123/2 x 20 engine, and two dynamos, an L and a Z, driven directly from an 8½ x 10 engine of the same make. The disposition of the lamps is as follows: lamps of 32 candle power each: show case of Pacific Mills, 14 lamps, entrance to exhibition 12 lamps, arches entering restaurant 5 lamps, total 31: lamps of 16 candle power each: Edison exhibit 9 lamps, toiler room, 19 lamps, press room 11 lamps, money office 4 lamps, restauram 77 lamps, grocer and druggist's exhibit 184 lamps, textile machinery 137 lamps, western art gallery 129 lamps, black and white art gallery 48 lamps, Home Sewing Machine Co. 7 lamps, D. P. Hisley, hatter, 5 lamps, aggregating 630 sixteen candle-power lamps. Total, with some other miscellaneous lights, 694 lamps.

The dynamos are under the immediate charge of Mr. A. F. Moore. All four are connected into a single resistance hox in their magnet circuit, each does its allotted task, and the current of all four is collected into a single circuit, being conveyed to distant parts of the building through feeders of the Edison Electric Tube Company. The current for the Edison space is measured through a meter such as is used in the First District in New York City, and no single feature of the system attracts more attention than this.

In the West Art Gallery the light shows to its best advantage, This gallery was designed by the same architect under whose supervision the gallery of the Boston Art Club was built, and is of the same dimensions. At the Art Club light is furnished by 375 gas burners, while the West Art Gallery, at the Institute Fair, is lighted quite as well, in the opinion of competent judges, by 129 Edison A lamps. This illumination is so pleasing to the managers of the Fair, that the company lighting the East Art Gallery with arc lights, will withdraw the same, and the Edison Company have been asked to place their lights there, as in the other. This installation is now going forward, an additional L machine being used for the purpose, furnishing current for the Art Gallery, as well as for one or two exhibitors who have asked to have their spaces lighted, through an

The unique display of the 7 lamps in the exhibit of the Home Sewing Machine Company attracts much attention. Each lamp is suspended from the ceiling by a flexible leanging support consisting of a piece of canvass tape three inches wide covered with blue satin. The wires ran from the ceiling through the tape to the lamp, which is suspended at the lower end, and these flexible langers are covered with artificial vines and flowers. In lighting the textile machinery, Mr. Paine arranged his lamps not so as to make an advertisement by a great glare of light, but in exactly the manner that experience had indicated was sufficient for lighting the same machines in actual mill work. There is thus no false impression given, and persons who buy apparatus for mill lighting on the strength of what they see at this Exhibition, will not be disappointed when they see the light in they own factories.

independent main

Mr. C. D. Stickney, one of Mr. Borden's assistants in the Edison New England Department, has the exhibition under his care every evening, and with such others of the departmental corps as can

make it possible to attend, explains the system to the lumitreds who find the Edison light the third intention of the Fair. Nor are the visitors mere sight-even. A large number of namufactures have been become acquaimed with the system for the first time, and many large nonfield the Department of their intention of visiting the Fair to investigate the details of the Edison light, and examine to practical ovokings.

ANOTHER PLANT ENLARGED. Messis. Weed, Parsons & Co., Allany, N. Y., who have been using a plant of 120 B lamps in their printing house, as mentioned in the Tenth Bulletin, have given us an order for a K dynamo, which will increase their plant four-fold.

ERIE ORAIN ELEVATOR FLANT. A plant of one I, dynamo and 202 A and B lamps is being installed in the Eric Grain Elevator. Jersey (sp. N. J. This elevator is owned by Meses. Hazeltine & Annun and has a capacity of 1,500,000 bushels.

MUNICH, BAVARIA. THEATRE LIGHTED. The lighting of the theatre in connection with the Munich Exposition, was finally warded to the Edition Company, as staned in the has Bulletin. The plant has been insufficed and the light has now been in us three weeks, illuminating the theatre disjt. This exhibit is receiving approved as being exceptionally successful in theatre Higher.

LENNI, PA. ANOTHER FACTORY PLANT. The Park Mount Cotton and Woolen Company, Limited, Lenni, Pennsylvania, have ordered a plant consisting of one Z dynamo and sixty A kamps. LIST OF EDISON PLANTS INSTALLED IN THE UNITED STATES. There are 123 Edison isolated plants, aggregating 21,998 lamps, now running or in process of installation in various parts of the United States. Below is a list showing the names and addresses of the purchasers, and their husness.

=				
	NAME.	ADDRESS	BU-INIS-	:
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Original	Robert & Name and	Co Builded, Organ	Second on A To a	
Hards, 5	etcham & Cu.	Nen Yer Car	Pres rs	
New Yor	de A. Norma In Laure	N V A New London	N.S. CRASHWALLSON	
Property	Hotes	· Hac Mountain Late.	S. S. C. S. S. M. C. L. St. L.	
Baldwar	Learneston W. d.	Philotophia	Heart	
Lames H	-	Newlorgh N V	Machine Strps	
Nathana	C Hear for	New York City	Wester Million	
Present N	and a Marthau Bar of all	New York City	Martine St. p	
Com Ar	And a Restrict Novel & Co.	Chear Himm	Carst quality may be	
Manham	the Relling Stock Co	New York City	Carshqua	
M.F.	en scattering (m	New York City	Carstige	
ber and	C Pality	··· Caracangna, Pa	Car Mega	
to F of	Name Co	Sulfwater, Mann	Curships	
Destreth	Lectures Works.	Patron N. J.	Lorensers Werks	
Orrgin b	Collegy & Navigation	Co. Bordard, Oregon	Meaning Dicks	
. pic Keen B	Caleay & Nations	Co. Bortland, One grow,	S & Topping to de	
James Car	arless It marit	Viola "Namonia"	Strate Vield	
Labor v Co.	aden Bennett	New York Caty	HereM Embig	
M. meets Y	hills	Winesa, Mass	Plant Aldle	
James Ta	51-e	Newburch N. V	Closh Mell	
Tanger, I	haw & Co	Ch wille there	Class Mill	
Il. Strain	C & Co	Paterson N. L	NO MILL	
Merrick T	Bread Co	Holyske, Mars	Decad Wirks	
Wannesta	Mills	New Bedford, Mass.	100 200 100 100 100 100 100 100 100 100	
Alford 16	der	Dolgenille, N. V	Mary Mary Co.	1
E. S. Laffe	av & Co.	New York Care	to C. I.	ı
I K. A.I	II Thurston C.C.	Moseconous, N. J 6	by tantition of the	ľ
1 K. S. F	ft Dealer & Co.	New York Cay	Antice Party	
derery &	Harmen	New Haves, Comm	A HO CO CHICKEN C	1
arr & H	dese	Bergen Point, N. J.	the state of the s	4
P Ber		Washington, N. J (egercentest tries manic .	
D 64	6	wateringson, A. J	ing the and request	2
	Buck Norman	New York City	partners	•
American !	Cu	East Boston, Mass S	agrantig	•
Per Licen				٠
Laten Su	car Reamery	East Bouten, Mass S	ega semany	
American Itaaton Sup Itrocklyn S	Sugar Refinery	Breaklyn, L. L S	near Reference	
American Leaton Sup Brooklyn S Ohio Stare	ingar Refinery Jeurnal	Colombos () S	ngar Refaces	1
American Leaton Sup Brooklyn S Phie Stare L. O. Mart	ingar Refinery Jeureal britan n & Wiechers	Breaklyn, L. L S	ngar Refinery	

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CONTRACTOR OF THE PARTY OF THE

	gramma a se que	100,000	
NAME.	AUDRESS	LUMINESS,	None
Harder Knitting Co	Hudson, N. Y		
Fastman Dry Plate Co	Rockester, N. V	Kouring McE	164
Silvey Manufacturing Co	Augura, tia	Photographic Materials	15
Mill Creek Distilling Co	Cincinnati, Ohio	Cotton Mall	450
Larraine Woolen Co	Pawnerker, R. L		. ω
Willimantic Linea Co	William and M. Committee	Woolen Mill	6.0
Boston Rubber Stor Co	Maldra, Mass		60
	Mechanicsville, Con.	Roller Shore	60
Whiting Paper Co	Steensteeville, Con.	Wooden Mill	131
Ladd & Logan	Heapene, Slave	Paper Mill	100
Criversity of Missouri	San Francisco, Cal	Agrecy	6.1
Prof. C. A. Young	Commiss, Ma	College	60
O. N. Taylor	Princeton, N. J	College	30
		Saw Mitt	- 11
American Printing & Dye Works.	Pall River & S. Y	Strange "Pilgran"	tog
Amony Manufacturing Co	LWE WIALE 21747	Printing and Dying,	250
U.S. Fish Communion	MINICHPERT, N. H	Conce Mill.	250
G. P. Ide Hruce & Co	wantighed D C	Straner "Allumost"	121
Allerton Cotton Mills	17my, N. V	Collar and Cuff Fartery	150
Bridgepost Organ Co	raywalle, Nd	Cutton Mill	750
A. S. Alell & Co.	Bridgiport, Com	Organ Factory	5-10
Matterawan Manufacturing Co	Bellimer, Mil	The Non	101
George Urlan & Co	Matterway, N. V	Hat Factory	100
It. Goff & Some	Baffalo, N. V	Plour McL	45
William Knale & Co	Particker, R. 1	Brail Million	fee
Rahmoure Stream Packet Co	Baltimore, Md	Punckatery	600
C. W. & F. Pantride & Co	taltimer, Md	Smanor "Vignes"	100
II. D. Smith	Sucage, Ille	My tireds States	310
Nortes Beatles & C.	Appletra, Wis	Residences, Factories, &c.	291
Best Brewing Co	bicago, Ille	Ploor Mill	13
Butters, Peters & Co	dilwanter, Wit	Empire Buckery	516
India Mart C.C.	allman, Mich	San Milli	60
Jordan, March & Co	losten, Mass	Dry thirds	100
Frie Cont. 12	incinnati, Oliva	Connery	13/2
Lebish Valley B. b. 41	tesey City, N. J 1	desage	202
Park Mount Cotton & Westen Co.	ayre, Pa	ar Nh 4a	150
Limited			
Limited, 1.	enel, Pa (estime and Winds pr	60

Turat,..... 21,795

THE CENTRAL STATION DYNAMO, The Engineering, London, some time ago published a lengthy article on the Edison System, in which is the following elaborate description of the Edison Central Station Dynamo, now running at the Holborn Vinduct, London, and at the Pearl Street Station, First Diariet, New York City:

In the disposition of the inductive partion of this armature it is identical with the armature of the unlinary. Senness direct-current machine, but the coupling up is simpler, and the course taken by the currents produced is in consecutable or unlended different.

The diameter of the armature when complete is 28 in., its length is 5 feet, and its weight is over four tons. When it is remembered that this mass is revolved within the hollow cylindrical space between the pole-pieces at a speed of 350 revolutions per minute, it will neadily be anticipated that if the heavy hars of copper were attached to the amounter only at their ends, which are between 4 ft. and 5 ft. apart, and resolving as they do at a circumferential speed of 43 ft. per second, the armature would be speedily destroyed by the bars thying out moler the influence of centrifugal force, and coming in contact with the iron pole-pieces which embrace them. To present this, the bars are held together at short distances along the length of the armature by colle of steel plans forte wire bound tightly round the bars trees bands of ones, by which they are insulated from them, and some idea may be formed of the high class workmarchip and fitting together of this finely constructed machine when we state that although the diameter of the resolving armature is 28 in., that of the cylindrical space within which it revolves is only 2814 in., thus allowing but one eighth of an inch clearance between the induction bars and the pole-pieces. It is needless, of course, to point out that this accuracy of construction adds very considerably to the efficiency of the machine, by enabling the armature to revolve in a more intense magnetic field than if, through less accurate workmanship, the magnetic poles, to insure the safety of the machine, had to be farther off.

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The electron angiests by which the unsgaria, field is produced, consist of
twelve benionally eligible all have of son about 8 it long, and colled throughtent their whole fragile with filth, installed suppression. The colls of these
magnets are connected together in you paralled consists of sec only, and
the resistance of the circuit or arranged, and which terms a derived to shunch
circuit to that of the machine, i. 21 ohms. The resistance of the arranged, and
the apparent of the control or arranged or five coloration is parallely income.

straids, meaning only alone is, Lu, of an outer (except) only of a master of modulot copper. The communities is a cylinder lattle jud of another of modulot copper coppers operate as their are indicated to see that meaning the collection of the co

The motive power is a horizontal engine of the Porter type, of 130 horse power nominal, litted with a Porter governor and expansion gear, and with a steam pressure of 120 lib.; it drives the armature which is monated on the crankshall at a velocity of 350 revolution per minute, the steam lesing supplied by one of Myers. Hatcheck and Wilmar's compound indular bothers. The weight of the machine with its engine and bedplate, which is common to both, is over 500 bots.

The table is keep the annature or it, thereby protecting its invalution and keeping in the in-threaten, there is is unaiming for adverse by the experist and from this blower three types are full white the clarkest can be used to be a consistent of the clarkest can be used by red price row, as a to make take the content of the clarkest can be used to be used to

Following this description of the dynamo, are descriptions of the Edison hung, conductors, fire protector, current regulator, electromotive-force indicator and meter. The article then concludes with the following interesting prediction:

The contraction of presence and a state of the contraction of the cont

No. 15.

FIFTEENTH BULLETIN.

The Edison Electric Light Company

December 20th, 1882.

(Thes bulletin, originally issued as a convenient way of asserting the impurite of distant agents, are usor, in response to numerous reposts, sort also to all succlebiblion, to give them information of the progress of the Company and of other matters of greater or less interest connected with electric lighting. Agents are particularly responsed to communicate so the Problem whereor practical point of general interest may be developed by their experience in installing or opernating our lights).

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	-

FIRST DISTRICT, NEW YORK CITY. This plant has been in operation night and day without a moment's stop since it was started at 3 P. M., September 4th. There have been no obstacles except those of a purely mechanical nature relating to the imperfect regulation of the engines. This trouble was mentioned in the last Bulletin. Everything relating to the electrical apparatus, as regards both the plant at the central station and the underground conductors, has exceeded our anticipations, and if any doubts ever existed touching the ultimate success of the system, they are now dispelled.

At the date of the last Hulletin, October 14th, we were lighting 85 houses. Since then we have made additional connections, and are now lighting 225 houses, wired for about 5,000 lamps. All of these buildings have been inspected by the Board of Fire Underwriters, and certificates authorizing the use of our light have been issued in every case. Additional houses are still being connected.

It is a singular fact that statements to the effect that the plant in the First District has proved a failure are still published. The most conspicuous of these statements, printed in the American Gar Light Journal, October 2d, was copied in the last Bulletin, and a detailed and explicit denial was there given by us to every part of the statement. It was that our First District was a "complete failure" because "the electricity was rouveyed away owing to imperfect insulation." This allegation betrayed such an utter lack of knowledge touching electrical subjects, it was surprising that a reputable journal published it, and we ventured to hope that in future the newspapers would be more careful. Such, however, has not proved to be the case. Recently another anonymous communication, betraying an equally astonuding lack of knowledge touching electrical matters and an equally complete perversion of facts, has been published in the editorial page of one of our daily papers. We refer to the following letter printed in the New York Sun, November 20th

"To the Engoy of The Sex:

Stu:--In reading the discussions relative to the Tearl street station of the Edison light, I have noted that while it is claimed that there is scarcely any loss from leakage of current, nothing is said about the loss due to the resist. mice of the long circuits. I am informed that this is the secret of the failure to produce with the power in position a sufficient amount of current to run all the lamps that have been put up, and that while six, and even seven, lights to the horse power may be produced from an isolated plant, the resistance of the long underground wires reduces this result in the above case to less than three lights to the horse power, thus making the cost of production greatly in excess of gas. Can the Edison Company captain this?

To the foregoing letter of "Investigator," the President of our Company made the following reply, which appeared in the Sun of December ad.:

"To THE EDITION OF THE SEN:

Sen: -- "Investigator" in Wednesday's Sun, says that the Edison Company is troubled at its Pearl street station with "a loss of current, due to the resist-

auce of the long circults;" also that whereas Edison gets "sex, or even seven lights to the horse-power in isolated plants, the resistance of the long underground wires reduces that result in the Pearl street station to less than three lights to the horse-power." Both of these statements are false. As regards lost that to resistance, there is a well-known law for determining it, based on Ohm's law. Hy use of that law we knew in advance, that is to say, when the original plans for the station were drawn, just what this loss would be, precisely the same as a mechanical engineer when constructing a mill with long lines of shalling can forecast the loss of power due to friction. The practica result in the Pearl street station has fully demonstrated the correctness of our estimate thus made in advance. As regards our getting only three lights per horse-power, our station has now been running three months, without stopping a moment, stay or night, and we invariably get over six lamps per horse-power, or substantially the same as we do in our solated plants. We are now lighting 193 buildings, wired for 4,400 lamps, of which about two thirds are in constant use, and we are adding additional houses and lamps daily. These figares can be verified at the office of the Board of Underwriters, where certificates with full details permitting the use of our light are filed by their own inspector. To light these tamps we run from one to three dynamos, according to the tauge in use at any given time, and we shall start additional dynamos as fast as we can connect more buildings. Neither as regards the loss the to resistance, nor as regards the number of lamps per horse power, is there the slightest trouble or disappointment on the part of our company, and your correspondent is entirely in error in assuming that there is. Let me suggest that if "Investigator" really wishes to investigate, and is competent and willing to learn the exact facts, he can do so at this office, where there is no mystery or concealment, but, on the contrary, a strong desire to communicate facts to intelligent inquirers. Such a method of investigating must certainly be more satisfactory to one honestly seeking knowledge than that of first assuming an error as the basis of a question and then demanding an explanation."

This denial disposes of the allegations made in the letter of "Investigator." Let us hone that we shall not be called upon again to answer such frivolous misrepresentations about our business.

MR. MORGAN'S RESIDENCE LIGHTED. The residence of Mr. J. Pierpont Morgan, at the corner of Madison Avenue and Thirty-sixth Street, New York City, is lighted throughout with an Edison isolated plant of 260 A and 116 B lamps. Gas has been abautloned with the exception of a few lets at various points for use when the electric light engines are not working. The different

6 lamp circuits throughout the house are protected by the usual Edition safety-guards against fee, while switches, each designed to control a large number of lamps, are conveniently arranged in the different rooms so that the lights are under prefer control, and can

be turned on and off in quantity, in addition to each lamp being lighted or extinguished singly.

The residence has been wired throughout, and the Edison lamps are located about as follows:

No. of the contract of the con	
Main halls and stairway	39
Attic rooms and halls	14
Dome over stairway	20
Servants halls and butler's pantry, closets, &c	15
3d floor hed-rooms and dressing-rooms	20
2d floor bed-rooms and dressing-rooms	
	40
1st floor:	
Drawing toom	42
Reception room	11
Library	10
Sitting-mont	22
Dining-ro, m	
	22
Stained glass skylight in diring-room ceiling	22
Conservatory	42
Basement : : -	28
Cellar	2S
Stable and carriage house	6
Engine-room	
_	
Total number of lamps	85

BOSTON. ANOTHER SUGAR REFINERY TO BE LIGHT-ED. We have received an order for a plant of one L dynamo and 150 A lamps, to be installed in the Bay State Sugar Refinery, Boston, Mass.

NEW ORLEANS. ST. CHARLES HOTEL TO BE LIGHT-ED. An order has been received from Col. R. E. Rivers, for a plant consisting of one L dynamo and 150 A lamps, to partially light the St. Charles Hotel, New Orleans, La.

TESTIMONIAL FROM THE OHIO STATE JOURNAL PLANT, COLUMBUS. The following restimonial has been received from the Ohio State Journal, Columbus, Ohio, lighted by an Edison isolated plani:

"the response to your implied I key to say that we are using the Elilon system of estricts (dags, and find it as every respect secreology) self-tools, It is safe, change, ending managed, are not once ear than gas peaper and stature although severably no extended to the stature of the stature of the stature and the stature of the stature and the stature of the stature and the stature of the sta

J. C. BRIGGS, BUSINESS MANAGER,"

AUGUSTA. ANOTHER PLANT INGREASED. We have received an order from the Sibley Manufacturing Company, Augusta, Georgia, for an L dynamo, thus increasing their lump capacity to 6 to hunss.

PAPER HAHGING FACTORY LIGHTED. A plant of one Z dynamo and 60 A lamps has been ordered by Messrs. Whiting & Campbell, manufacturers of paper hangings, New York City.

NORTH CAROLINA. COTTON MILL PLANT. We have received an order for a plant consisting of one L dynamo and 100 A lamps for the cotton mill of Mr. R. Y. McAden, at Lowell, North Carolina.

HOLYOKE. ALBION PAPER MILL TO BE LIGHTED. We have received an order from the Albion Paper Company, Holyoke, Mass. for a plant of one L dynamo and 150 Å lamps to be installed in their paper mill.

NORTH ADAMS. ARNOLD PRINT WORES. We have received an order for a plant consisting of one L dynamo and 150 A lamps, to be installed in the Arnold Print Works, North Adams, Mass.

AKRON, OHIO. STRAW-BOARD FACTORY PLANT. A plant of one L dynamo and 130 A limps has been ordered for the factory of the Portage Straw-B.ard Company, Akron, Ohio.

BLIOU THEATRE LIGHTED, BOSTON. As Edison plant consisting of about 6to lamps has been installed in the new Bijon Theatre, Boson, of which Mesers. Hastings & Tyler are proprietors. The opening might of the theatre, when our plant was started with great success, was on December 12th.

The station from which the theatre is lighted is located about 500 foot away in the Lauments of the primiting office of Meses. Cashman, foot away in the Lauments of the primiting office of Meses. Cashman, Kaziting & Ca., No. 623 Washington Street. In this station we have placed a lathness that the latest power, field through two Korning injectors supplied with two ther from a one into the piep part two Korning injectors supplied by the vater from a one into the piep part two Korning injectors supplied by the caster. But a cytical visible file in the basic part of the control of the co

goo feet or No. 19/£ Edison Electric Tudes, similar to those hald in our First Directric New York City. A filt be conductors a best the conductors when the uniform the stage to a joint at the right hand side of the proceeding uniform the stage to a joint at the right hand side of the proceeding regulating papersais, bitter, and where all the lights can be controlled by one man. Here also, are the other serquitates for nising and lovering the intensity of the lights, one conrolling those in the auditorium, another those on the first, and the third controlling the lights on the processions area. Here also, the a single board, are all the safety plags and eleves worthes, which controlled the lights on the procession in the analytic incontrol all the highest to the stage, and in the analytic incontrol all the highest to the stage, and in the analytic intensity to the stage of the varieties for the lights at the front currances, foyer and offices, are on a Board in the bort office.

In the lighting of the stage a broad departure has been taken. There are no footlights whatever, the stage being lit by 192 A lamps placed in three rows on the surface of a concave tin reflector running around the back of the proscenium arch. Between the flies are similar tin reflectors, straight across the stage, in which are placed 140 A lamps. These latter fixtures can be raised and lowered by ropes and pulleys as may be desired for stage effects. In the auditorium, hanging from the centre of the dome, is a fine crystal chandelier of Moorish design, illuminated by 65 A lights, and at three other points from the dome hang smaller chandeliers of similar design, each with 18 A lamps. In the gallery and second tier of boxes are side lights with 44 lamps, and under the galleries 44 others. The staircases are lighted by three chandeliers having 12 lights each, and the foyer by one chandelier of 6 lights and two of 3 lights each. There are four chandeliers of 4 lamps each and one of 6 lamps in the offices, and at the front of the theatre is a lantern containing 40 A lamps. The total number of lamps is 644.

This installation, one of the largest and most complete ever made, was finished in two weeks from the receipt of the order.

Canal

THEATRE LIGHTED AT CHICAGO. TESTIMONIAL. Mr. Daniel Shelhy, Proprietor and Manager of the Academy of Minsic. Chicago, furnishes the following restimonal about our light in use in his theture.

THE WESTERN EURON LIGHT COMPANY: "CHICAGO, Nov. 15th, 1882.

GINTLEMEN—Being the first manager in the United States with nerver ends to try the experiment of lighting the ambitorium of a theatre with the Eddown Incandescent Light, it gives not great placurar or not a desirable tion your y-tren has given use. The light is steady, not and placing to the eye, no during or glare, no dust or smooke, no feat. We can now dispense with the lighting up, as in gas, by the alcohol torch, thereby reducing the danger of firs in the Initiality.

songly one are fittening. In the first arrangements are completed. During the lyindegitized under his protection that the first arrangements are completed. During the winter mouth, which the loss is helsed with steam, the same built supplies the power for both expression, naking the express of lightling positively nothing. During the warms weather the express to with the engineer's salary and cost of each.

The lights are under perfect control by a system of whiches in the prompt-place and extend on and off at will. I am using the laurest in arthogeneous, lobdes after the latter level perfect in the latter level perfect in the latter level perfect in the latter level perfect latter la

Respectfully yours, DANIEL SHELBY,"

PERSONAL CONTROL OF THE PROPERTY OF THE PERSONAL PROPERTY OF THE PERSON

THEATRE LIGHTED AT HAVANA, GUBA. The Allisis THEATRE, I lavans, is lighted by an Edison plant. Mr. A. Montanna, the agent in clarge of the Edison light at Havana, has famished in Edisoning particulates of the installation. The plant consists of two Z dynamos with 186 II lamps and 11. A lamps in the theatre, also alout 20 lamps in the building where the dynamos and engine are placed. The arrangement of the lights in the theatre is as follows: Foodlights, 22 II lamps, two borders 4 to 10 Hamps each, two borders for the contract of the light of the lamps and the contract of the lamps to the contract of 10 Hamps each, two borders for the contract of the lamps to the contract of 10 Hamps each, two borders for the lamps to the la

of 6 B lamps each, 36 branches of two B lamps each attached to the pillars of the three galleries, four clusters of 4 B lamps each placed on either side of the drop near the first hoxes, 24 B lamps distributed in the four passages 6 in each, 6 B lamps on the landings in front of the mirrors, to B lamps placed in several private hoxes, 6 A lamps in the lobby and 5 A lamps on the outside, under the colonnade, making a total in the theatre of 186 B and 11 A lamps. The borders as well as the footlights have tin reflectors closed at the top, which allow all the light to be thrown on the stage, and this accounts for its being sufficiently lit, notwithstanding the comparatively small number of Lumps used. Twilight and night effects are obtained by means of resistance hoxes. The dynamos are striven by a 14 horse power steam engine in a building 120 feet distant from the theatrethe conductors being run overhead at a height of about to feet to the theatre. These two dynamos are run independently from each other, one of them furnishing the current for the lamps in the arcade, the lobby, the boxes, the passages and the upper tier of gallenes, while the other dynamo famishes the electricity for the Lumps in the two lower tiers of galleries, the lamnes for borders and footlights, and also for the 4 clusters in front of the curtain,

The theatre is it in a creay night from 6:30 to 12 c/clcck, and the light has received high prince from the public in general a well as from the actors, not only on account of its scale: effect, but also for its non-theating quality, the temperature of the literate being much reduced by its wei; an advantage not to be order-locked in a tropical formate. The difference of these theorem is going to the formation of the principle of the public of the public of the public of the Edition liquip. During the eight nourity that this light has been meed, no accident has impacted compelling a suspension of lighting the theatre. The a corange file of the himpsor for necedits to be them.

"Paul Jaisius, the Genesia demande and critic, structured most of the experiments went the centric fight sends in a father excreted in Nuclia for the Develocil Ediblotics. "Datas thinks that the Bilos on far precisional countries for the price and/or, port, efecting fight, which countries fixed countries for the price of the pri

THEATRE PLANT AT BRUNN. NO GAS USED. The Loudon Electrician, November 25th, contains an article by Mr. Francis Jehl on the lighting of the new theare at Brunn, by an Edison dain. The following extracts are of interest:

"Hrunn, in Moravia, which is the chief manufacturing centre of the Austrian empire, has now beyond doubt the farest installation of electric lighting on this side of the Atlantic. The new theatre, which is owned and governed by the numerical council of that city, is entirely helifol by the fallow system of electric lighting. The huilding, which occupies a whole square, contains about 1,600 lamps, and has no connection with gas whatever. This theatre has all the modern improvements that can be suggested. * * * All the lights on the stage and auditorium are governed by regulators, and can be varied to any desired intensity. There are six rows of cross lights, each row being divided into three circuits, having 40 lamps each, making in all 720. Each one of these circuits can be regulated, or all together. Then the foot lights, which are divided into two sections, have three circuits each, and contain an aggregate sum of 180 lamps. There are 60 lamps to be used as portable ones, examing from underneath the stage by means of flexible cables. Thirty more lamps, to be worked by flexible cables, come from the first stage gallery, and Go more, for the uprights on each side of the stage, making 1,030 lamps on the stage above. The main electrolier has Go lamps, and 110 more are scattered in different parts of the auditorium, amounting to 1,220 lamps, which are operated by regulators shullar to those used for gas. The regulators consist simply of resistance colls, made of German silver wire, and are inserted into each circuit which is required to be operated. Each regulator is divided into

mony parts, we that sixty of variation can be elatined. The restinance and use we used for extra equilate Agracian to the number of Brays in the use of the part of the part

NEW YORK CITY. SPIGE MILL TO BE LIGHTED. We have received an order for a plant consisting of one 2 dynamo and 55 A lamps, to be installed in the store and space mills of Messrs. B. Fischer & Co., Nos. 355 and 327 Greenwich street, New York city, wholesale dealers in eas, collects and spices.

A MISSISSIPPI RIVER STEAMER LIGHTED. A plant of one Z dynamo and 120 B lamps has just been mealled on the Steamer "Kate Adams," which is to run between Arkansas City and Memphis.

NEW YORK OITY. AMERICAN EXPRESS PLANT. We have just completed the installation of a plant consisting of one K dysamo and a 20 A lamps in the offices of the American Express Company, No. 65 Breadway, New York City. The engine which runs this dynamo is supplied with seam from the mains of the New York Steam Heating Company.

PARIS, FRANCE. FIVE MORE EDISON PLANTS. Besides the plants in the dry goods store, Au Bon Marché, and in the St. Lazare Rallway Station, heretofore mentioned in the Bulletin, the following plants lave been installed and are now running at Paris,

- A plant of one Z dynamo with 60 A and 20 B lamps in the Telegraph rooms of the Minister of Posts and Telegraphs.
- (2). In the glass-works of M. Pochet, a plant of one E dynamo and 17 A lumps.
- (3). A plant of one Z dynamo and 65 A lamps in the Grands Magasius du Louvre.
- (4). A plant of one Z dynamo and 60 A lamps in the Banque de France, used for lighting the presses on which the bank notes are winted
- (5). In the establishment of Messes. Lodde Fils, dyers of feathers and manufacturers of feather dusters, a plant of one Z dynamo with 50 A and 20 B lamms.

PENDLETON, ENGLAND. COTTON MILL PLANT. The Kingsom Cotton Mills of Measts. Wright, Turner & Sons, at Pendleton, near Manchester, England, 'employing 700 hands, are now lighting by the Editon system. There are at present 500 lights in use, suspiled by two K dynamos, but it is intended to increase the enactive of the bant to 1,000 lifety.

AMORY MILL PLANT. This installation, mentioned in the Fourteenth Bulletin, has been completed. The following extracts are taken from the Manchester, N. H., Mirror, November 9th:

"The Edison electric light has been in operation at the Ansory mill scarcely a week, but in this bird period it has more than met the expectations of the agent, who selected it from among the various methods of lighting by eleclity now before the public, believing that it was the coming systems. His (197) good judgment in so doing has been highly communited by visitors, some of whom have been manacturers in contemplation of introducing into their business the electric light. The milk at prepart, is provided with 240 lights of 16 candle power each, and the number will be increased in a few days to 275. * * * There is no impleasant flickering novement, but a mellow whom that gives no offense or pain to the eyes, and renders labor under its influence. as far as the sight is concerned, perfectly mobjectionable. In the few days that the light has been in use the employees of the mill have expressed great thankfulness for its introduction, and all are amons to work in the rooms where it is in operation. It is beated in the upper weaving and cloth room, and partially in the basement wearing room. . . . The lamps now in use, furnish light agreece for four 4-quarter fooms, each taking the place of two gas jets. So simple is the machine generating the light that it is easily managol. After it is once started it practically takes care of itself, and the man in charge may busy his attention with other work, only turning now and then to the machine to see that everything is moving smoothly."

CHAIR FACTORY PLANT AT OARDNER. An order has been received from Messrs Heywood Brothers & Co., Gardner, Mass., for a plant of two L dynamos and 3c2 A lamps to light their thair factors.

BALTIMORE. ANOTHER COTTON MILL LIGHTED. An instillation of a plant consisting of one K and one L dynamo with too A lights, has just been completed in the conon mill of the Mount Vernon Company, Baltimore, Maryland.

PHILADELPHIA. WORSTED MILL PLANT. We have just completed the installation of one K dynamo and 250 Å lampis, in the worsted mill of Messs, Piss, Banes & Érben, at Philadelphia, Pa. This plant has been increased by the addition of another K dynamo, 350 lamps.

SACO. ANOTHER COTTON MILL PLANT. An order has been given us by the Vork Manufacturing Company, Saco, Maine, for a plant consisting of three K dynamos and 750 Å lamps, to light their cotton milk.

(21)

"A year ago there were a dotent companies ready to promise to familial any cloy with the discussioner lights—that is, to light interiors with small was been according to the property of the carriery light field. It not only occupies the field, but it comes now filling, the property in the field in the only occupies the field, but it comes now filling, the property in the field in the companies of the property in the companies of th

The Timer Is lighted on the circuit of the first district. I went into the counting-room and elitorial room last night to imprire about it. They spake warmly in its praise. The best artificial light I ever wrote by,' said the

Figure one limitings are more using the electric lags reducing, and more are being able over 4pc. 1, 19th one engine being used any season and is allient affects that we ever promised and more. The best force and is allient affects that we ever promised and more. The best leave no strip the contract of the promised over the most better to be leave a profession. The light aroundy founded in about the lamps to the lower profession. The light aroundy founded in about the lamps to the lower than the light around promised over found one for the more contracting, and are clearly and profession for the light around profession which we have the lamps to the lamps that the light and the lamps that the light will be the lamps that the light will be the lamps that the light will be the lamps that the lamps that the light will be the lamps that the light will be the lamps that the lamps that the light will be the lamps that the lamps that the lamps that the lamps that the light has the lamps that the lamps that

heavies in the Cay—that of which Judician; space is the const.

The Hand and Tarleyon exhibitions are the const.

The Hand and Tarleyon children, the American is the Cay of the

The feedings of the lastiness manager was to the same effect, but he added: 'It is not unity better than gas hus changer. Being outside of the first added;' It is not unity better than gas hus changer. Being outside of the first district, the Irrards in lightlo from an isolated plant—that is, we farmian our own clearticity. We have two engine. The bott lovel,—engines, engineers, organized, organized, and all—amounts to about \$7,000 a year. Our gas allis for several years have been \$14,000 a year.

17

The Edison Isolated Company, besides the Herald Building, has already lighted about 140 Indibugs—mosely munofactories—throughout the country, These included the Philadelphia Lodger, Olds Start Fannard, Davapoort Garette, Philadelphia Public Record, Baltimore, Son, and Boston Herald. Said Balade Mecker of the Herald Isolate.

"It is as much better than gas as gas is better than tallow candles."

CONTRACTS CLOSED BY THE WESTERN EDISON LIGHT COMPANY, CHICAGO. The following plants have been sold by the Western Edison Company, since the last Bulletin:

- A plant of one Z dynamo with 45 A and 45 B lamps, now in operation in Kern's Flouring Mill, Milwaukee, Wisconsin.
- (z). For the works of the Novelty Iron Works, Dabaque, Iowa, a plant of one Z dynamo and 60 A lights. This plant is now running.
- (3). A plant of too lights, for the Minonk Coal and Coke Co., for supplying light to several buildings and residences in connection with the coal mines of that company at Minonk, Illinois.
- (4). A plant of one Z dynamo for the mill of the Batavia Paper Co., Batavia, Illinois. Only 35 A lamps will be used in connection with this plant for the present.
- (5). A plant of 177 lights for the premises of the American Express Company at Chicago.

THE ALBERTON PLANT. The following extract, from the Baltimore Sun, refers to the plant of the Alberton Cotton Mills, Elysville, Md., mentioned in the last Bulletin as about to be installed:

"Moreon, James A, Gary A, Co., who have had the folious meanbound teaching independent on the Atherno Control Mark 179/volt; with the bluster and Oldon Ralamed, say that the hamps have more than realized the expectations. Several plats were trained or Towardy sight, freely more will be in use to singlet, and the number will be increased to 250 or 250 as 100 as notice. Mr. Carry says the doces on with to put itsueffer an exceed as an advocate of anything smill be has experimented prevenily with it and it worky as provided as actions, to the control of the control of anything smill be has experimented prevenily with it and it worky as proved in a sacrifly, but considerated of the

THE SIBLEY MILL PLANT. AUGUSTA, GEORGIA. We take the following extracts, relating to this plant, from the Augusta Chronicle and Contitutionalist of October 3181:

The dynamo or machine for generating the electric current is placed in the losement of the building, and is run by the same water wheels used for running the nill itself. These dynamos are about 61/2 leet high by 3 leet square, and have a capacity of 200 fames each. * * * * There is little or no heat in the light, which is also perfectly safe because whenever the glass globe breaks the light goes out instantly. So safe is this system of illumination too, that a strop light' can be used about in the but of the mill and sawdust of the work-shop without danger. Among the loops is a portable lamp that can be attached to any of the sockets by a flexible cord for examining the looms or spindles, for thing a loose thread, repairing the machine or connecting stripe. It matters not how this portable lump or any of the others are held, it burns as well up-sile-down as in any other position. • • The lights are so arranged no the offices and machine shops that they can be separately turned out by means of screws or switches, while weaving, spinning or carding room lamps can be extinguished by rows, sections or together. The lamp being an inverted glass, pear shaped, none of the light is lost. • • The Sibley Mills seems to have secured the perfection of electric light at last. It is the refusement and concentration of Edison's test efforts, and appears to eclipse every thing in the way of house lighting."

WESTERN EDISON LIGHT COMPANY'S PLANT. The plant of 250 haups connected with the leadquarters of the Western Company's now in successful operation, supplying light for their use in their building Nos. 51 and 53 Walson Avenue, Chicago, also firmilating light 10 other offices and stores in siglection buildings. There is sufficient boiler and engine capacity in connection with this plant to farmilaty 20 additional A lambs, which it is the intention of the Western Company to make use of at an early dale in supplying order parties in the vicinity.

TESTIMONIAL. RESIDENCE PLANT AT APPLETON.

The following letter relates to a plant installed at Appleton, Wisconsin, by the Western Edition Lagle Company, in the private residence of Mr. H. J. Rogers, the President of the local Gas Company of Appleton. This residence is the first one lighted exclusively by the Edison light in the Vers. Mr. Doare's residence in Checago not having been completed until afterwards.

"APPLETON, WO., Nov. 11th, 1882, WENTERN EDISON LIGHT COMPANY: CHICAGO, ILL.

GENTLEMENT—In reply to yours of recurs that in relation to the Edition Electric Light in any resistence, I have to say that I have about you have also all have used them alsout 60 days. I am phraced with them beyond expression, and do not see how they can be improved upon. No boat, no write, into with a start of the proposal pages. No boat, no fire latest also also the light steady and pheasent in every way, and more economical than gas, and quite a verifilation.

Yours truly, H. J. ROGERS."

APPLETON, WISCONSTIN. RESIDENCES LIGHTED. The esidence of Mr. II. D. Smith, and that of Mr. A. L. Smith are lighted with the Edison light, the hung-beng run by awar power. In a recent letter to the Western Edison Light (Conquary, Mr. A. L. Smith speaks as additions of his plant.") Pre-stume you have been informed of the successful lighting of my houses by the Edison system. I can only add my own nestimony, but far every particular it is most satisfactory. It does seem as if perfection in illumination has been reached."

ENOLAND. TWO OGEAN STEAMSHIPS LIGHTED. The Elison Company of England have lighted the steamship "Tursuers," and are now installing a plant on the "Waltner," hold bedging to the Union Steamship Company of New Zealand. Each plant consists of one L dyname and 156 A large driven by a Brotherhood 3 inch cylinder engine.

(10)

PHOTOGRAPHING AT NIGHT BY THE EDISON LIGHT. Daring the progress of the Institute Fair at Boston, menjoinced in the Fourteenth Bulletin, the Heliotype Finising Company book two pilotographic views by the Bildt of the Edison Imps. One of these photographe was of the Western Art Callery, Institute Fair Bullding, and the other was of Le Pagés picture of Joan of Art, on exhibition at the Fair. Both photographe was of the Pagés picture of Joan of Art, on exhibition at the Fair. But high photographe was called the progress of the Fair Bullding, and the other was of Le Pagés picture of Joan de wenty minutes in other hands of the Fair Bullding, and the other was not been short and twenty minutes in other acts can be called the photographe by the intendedecent light. If extens that he has a bayes, failed when attempting to make pictures by the art light, as its unsteadingset causes effects similar to those when the subject causes. First of the above photographs have been sent to us by the Heliotype Company, and are hung in our office.

BORDEAUX, FRANCE. STORE LIGHTED. A plant of one Z dynamo with 40 A and 40 B lamps has been installed in the establishment of Mestrs. F. Dandicolle Fils, large provision merchants.

ANGOULEME, FRANCE. MACHINE WORKS PLANT. We have installed a plant consisting of one Z dynamo and 60 A lamps for Messrs. Alex. Laroche, Jouhen & Motteau, Angouleme.

VORGES, FRANCE. HOSIERY WORKS PLANT. There is now running in the factory of Messrs. Paul Schmidt & Fis, manufacturers of hosiery at Vosges, France, a plant of one Z dynamo and one E dynamo and 150 B lamps. This plant is worked very satisfactorily by a turbine wheel.

NANCY, FRANCE. TANNERY LIGHTED. A plant of one Z dynamo and 60 A lamps has been installed in the tannery of M. Luc, at Nancy.

PEXONNE, FRANCE. POTTERY LIGHTED. We have installed a plant of one Z dynamo with 20 A and 20 B lamps, in the porcelain pottery of Messys. Fenal Frence, Pexonne.

NORMANDY, FACTORY PLANT. A plant of one Z dynamo with 30 A and 40 B lamps has been installed in the cotton spinning factory of M. Philin Bazin, Coude-sur-Noireau.

ROUBAIN, FRANCE. TWO MILLS LIGHTED. A plant of one Z dynamo with 50 A and 20 B lamps, has been installed in the cotton spinning mill of Mesos. Motte et Meilkassoux, and a plant of one Z dynamo, 32 A and 56 B lamps in the cotton spinning mill of M. Lefebra, both at Roubain.

TOULOUSE, FRANCE. CAFÉ LIGHTED. We have installed a plant of one Z dynamo with 40 A and 40 B lamps in the Cafe de la Comedie. Toulouse.

DANTZIO, PRUSSIA. INFERIAL DOOK YARD PLANT, This plant, mentioned in the Second Bulletin, has been in operation for some time and it working very satisfactorily. As 'now number, the plant consists of two 2 (pursues with 66. An all plants). The lights are used in the machine shape, there being a B hamps. The lights are used in the machine shape, there being a B all pumps termy does and and Annups force was native out all plants per long formalised with this stakes about 15 inches in diameter, united all the time inside.

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SEVENTY-EIGHT DEATHS FROM GAS. Among the recent deaths from gas are the following:

"October 7th, Emma Strauss, was found dead in her room at No. 90 October, Theodore Haske and William Husky were found dead in bed in their room, at the Annex Hotel, Fulton Street, Brooklyn, having been suffocated by gas with which the room was filled. The was was not turned * Anna Buck was found dead in her bed, at Jersey City Heights, October 12th. The room was filled with gas, which was escaping from the * * * Mrs. Annie Stademeyer of Newark, N. J., was found in her bed at Hartmann's Hotel, 47 Bowlery, New York City, November 29th, unconscious and apparently lifeless. The mon was tilled with gas, which was escaping from two jets of the centre chandelier. It was stated she could not recover. * * * H. P. Keys of Hillsboro, Pa., was found in a dying condition in his room at the Valentine House, Washington, Pa. October 21st. The room was filled with gas. * * * A man giving the name of Jack Stiles of Brooklyn, was found dead in bed, October 22d, at the United States Hotel, Newlourgh, N. Y., sufficiated by gas, which was turned on in the room. Hiram Tucker of Boston, was found dead in his room, Sunday, October 22d, suffocated by gas. * * * Timothy Kelly of No. 2207 Tenth Avenue, was found dead in his bed-room, on the morning of October 27th. He had been sufficated by gas, which was turned on but not lighted. * * * On October 28th, Miss Susan Fendick of 111 Fort Greene Place, Brooklyn, was found in her room unconscious, the room being filled with gas. She died soon after, It was found on examination of the gas feature, that she had neglected to turn the gas entirely off. * * * A gas explosion occured in the Indiana, Bloomington & Western Railway general office, November 26th. The gas had been blown out in the vault, and when D. H. Roche and F. C. Case entered, and lit a match, an explosion followed. All the hair was torn from Roche's head and face. He also inhaled the flame, and, it is believed, will die. Case was injured nearly as hadly. The explosion shook the building, and broke every pane of glass in the vicinity. * * * Paniel J. Leamy was found dead at No. 48 Chathana Street, New York City, November 19th, having been sufficated by gas, which had leaked from a defective gas pipe in his bed-room, * * * Lewit McCann and wife were found dead in bed at the Astor Flace Hotel, November 13th. They had evidently been sufficiently by the gas, which was

turned on. * * * On the 16th of November, Dr. G. W. Weiner was found miconscious in his room at Penver, Colorado. An argand gas lorner was on the table, turned on, but not lighted. All efforts to revive the asphyxiated man neowed futile, and he died the same day.

The following list of deaths from gas during the last two years, exclusive of all those given above, is taken from the New York Enering Telegram, November 24th:

"R. E. Shilwell, North Ricer Hotel, January 8, 1881; P. Nolan, No. to First street, January 8; F. Healy, No. 39 Bowery, January 8; T. Coleman, Putmant House, January S; A. O'Donnell, No. 249 East Thirty-lifth street, January 8; J. Brennan, No. 30 Howery, January 22; J. Rahn, Central Hotel, Elm and Canal streets, January 24: H. Knapp, Central Hotel, Elm and Canal streets, January 24; Barbara Weiss, No. 955 Third avenue, February 13; Henrietta Brambolder, No. 955 Thiol avenue, February 13; Sophie Venson, No. 200 West Fifty-stalls street, April 25; Gastav Bertlein, No. 310 Broome street; Frank Watson, No. 28 Howery, May 9; J. McCarthy, Grand Union Hotel, September 29; Rev. A. Green, Hamilton House, Orbiber 20; D. G. Eichberger, Grand Union Hotel, October 31; Three circus men known as Shanghal, Darkey and Lengthy, Patron House, November 13; J. Wilson, No. 387 Fourth avenue, November 21; W. Zimmermann, Lumary 7, 1882; M. Coyne, January 27: P. Goeghan, No. 226 Fast Eleventh street, January 31; F. J. Durand, Occidental Hotel; - James, No. 48 Chatham street, Telemary 26; R. H. Stryker, Bridge Hotel, March 1; J. Hann, No. 38 Howery, April 26; Two unknown men, June 2; An unknown woman, June 2; P. R. Covert, French's Hotel, June 1; W. Meakin, Engle Hotel, June 2; Mrs. W. Meakin, Eagle Hotel, June 2; William Thomas, Van Dyke House, June 27; C. 14. Miller, of Missouri, Cosmopolitan Hotel, Broadway and Chambers street, July 7; Guianaurd Romanillo and Auglo Zamphini, No. 71 James street nst 13; Mrs. Catherine Hottemoth, Bouery Hotel, August 22; Mmr. Delveriel, or Josephine Parant, Sturtevant House, September 15; Henry Coulding, No. 108 South street, September 30; Miss Walcott, at the residence of Captain J. H. Bailey, at No. 14 West Twenty-eighth street, October 13; R. B. Reynolds, No. 28 Bowery, New York, January 4. In other Citiest C. S. Thomps Middletown, Conn., August 4, 1881; Delegation of Indians, Washington D. C., January 8; Robert Angis, Brooklyn, N. V., October 13; Julia Nelson, Brook-Iya, N. V., October 15; Nora Lawson, Brooklyn, N. V., October 15; W. T. Craddeck, Baltimore, Md., October 31; Mr. Tiefenl, Philiphylin, Pa., November 18; Mrs. Tiefenl, Philadelphia, Pa., November 18; C. Relly, Baltimore, Md., January 7, 1882; F. Hayes, Boston, Mass., March 19; A stonecutter al Port Jervis, N. V., April 25; A infaister, Troy, N. V., May 4; Entile Acrosic, steamer Providence, May 5; Lillie J. Brant, steamer Providence, May 5; J W. Langley, steamer Providence, May 25; J. A. Osterhoudt, Roudout, N.

June 4; Patrick Mechan's two children, at Pullman, 18., Judy (2; Andrew II, Van Rijer, Preaknes, Pasaic, N. J., Pasaic Hotel, September 15; M. Macker, No. 359 Montgomery street, Presey City, North River Hotel, October 17; A. E. Stowe, Sarafoga, N. V., October 24.

TWO TROUGAND BYUE RIVINDED AND BEVENTY-ONE FIRES FROM GAR, LAKEP & AND CANDLED. The report of George II. Sheldon, Fire Marshal of the city of New York, for the year ending December 13st, 18So, shows that in this city from June, 18So, to January, 18St, there were 425 freet caused by ignition of exciping gas, 31 fires caused by explosions of gas, 1, 1857 fixes from the upsetting of high-level candle, and 907 fires caused by window cartains, goods in stores of show windows, circhiansatence, choling, drayers, resting, paper, woodwork, &c., taking fee from gas jets, candles and Junys; the total number of fires agregating, 2,527.

WEST POINT MILITARY ACADEMY PLANT. A plant of one Z dynamo and 6c A lamps has been ordered, for use at the United States Military Academy, West Point.

BOSTON. DRY GOODS STORE PLANT. We have received an order for a plant consisting of two K dynamos and 500 Å lamps, to light the dry goods store of Messrs. R. II. White & Co., at Boston Mass.

CHIOAGO. MR. DOANES RESIDENCE LIGHTED. The residence of Mr. John W. Doane, a new building opened for the first time on the evening of Newneber 10th, is lighted with an Edison isolated plant consisting of 250 launys and one K dynamo. The losses is lighted throughout with the Elison light, gas having heen entirely omitted, and so facilities for any other light introduced. The lights are distributed as follows;

large hall 3, smaller halls 2, wine room 1, servant's hall 2, servant's dining-room 2, closet and hath 2, laundry-heater 1.

Parlor plook: Vestibule t light, main hall 20 lights, reception-

Parlox PLOOK: Vestibule t light, main hall 20 lights, receptionroom to, parlor 22, including real light, library 9, diming-room to, including grate light, smaking-room 11, cloak-room and closet 2, elevator 1, back hall 2, butler's matter 2, butler's store-room 2.

SECOND FLOOR: Main Itall 24 lights, back hall 3, in seven bedrooms 47 lights, in two dressing-rooms 6 lights, in six bath rooms 7 lights, closets 2 lights.

THEO FLOOR: Ball room 24 lights, main hall 20, billiard room 4, closets 2, back hall 3, servant's rooms 10, spare bedroom 6, bath-

MISCELLANEOUS: In the dome 20 lights, stairs leading to dome 1, engine room 4, stable and stalls 12, coach house 4, coachman's and stable-help's quarters and bath-room 4.

The following extract is taken from the Chicago Tribune of November 11th:

"Mr. Doane has recently completed what is probably the fasest house west of New York, and it was fit that he should inaugurate it by a celebration of his silver wedding. This fete occurred last evening at No. 1,827 Prairie avenue, and it was a grand social success. The interior of the house is as exquisitely rich as taste and art can make it, and last night it presented a scene of grandeur and heavy rarely witnessed. Mr. Danne has dimminated his house with 250 of the Edison electric incande-cent lights, and they made the house brilliant in the extreme, and brought out the elogant toilets in all their rich colors. From the curb to the door of the ve-tiletic there was spread an awning lighted up with electric lamps. * * * In the reception room, from the centre of the ceiling, there imag a chardelier of suday, to which were appended the electric lamps, in the centre of which was a rich and large longuet of roses. The elaborate mantel of the parlor was bidden by banks of exquisite flowers, while from out the brass hearths in all the rooms and in the balls shone forth electric lights, so arranged as to unitate a glowing tire, while directly in front were entwined exotic vines, flowers, etc."

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"The Edison electric light at the Whiting paper mill, No. 2, is working successfully. The plant has a capacity of 120 half lamps distributed in all the rooms of the mill where artificial light is used, nine in front of the Whithor Hotel and four at the Front street entrances of the opera house. At the mill the engine-room has the same number of lamps as formerly of gas jets, and is fermished a better light, while in the remaining rooms the illumination is about the same as before. A few days ago John Ratiburn, an exterioured engineer at the Hadley Thread mill, took indicator diagrams from the engine driving the electric plant at the Whiting No. 2 mill and found the net consumption of horse-power after deducting the friction diagram to be 5.8, although the guarantee of the electric Company admitted of a communition of table horsepower on the work. The 360 Edison lights at the Appleton street mill of the Merrick Thread Co., will be in operation within two weeks, the workmen being now husy arranging the apparatus."

THE BALTIMORE SUN PLANT. We take the following extract from the Baltimore Sun of October 13th:

"A notable event in the history of the electric light is the introduction of the incandescent system for the first time in Baltimore, the city which was so prominently connected with the first practical test made of electrical telegraphy in May, 1844. The Sux is the first to use here this next and safe means of illumination, adopting Edison's invention. This tamp was some time ago exhibited in Haltimore as a curiosity, but it is now for the first time employed practically to take the place of gas. All parts of Tine Sun laces Bottonson from the engine room beneath the level of the pavenent to the composing-room on the fourth story, (both included,) are fitted with the elegant pearshaped globes which distinguish the locandescent from the arc system lamps give out a clear, soft light, in comparison with whach the gas jet has a tame and dingy appearance. The scale on which the new light supplants the old may be interred from the fact that the composing-room floor alone is fitted with sixty lamps. The advantage of a light which produces little heat and no unwholesome gases will be appreciated in all large establishments where a great number of persons are employed."

RUBBER FACTORY PLANT AT READING. The Mayall Rubber Company have ordered a plant of one L dynamo and 150 A lamps, to be installed in their rubber factory, at Reading Mass.

ASHBURNHAM. CHAIR FACTORY PLANT, We have received an order for a plant of one L dynamo, and 150 A lamps, to light the clear factory of the Boston Chair Company, at Ashburnham,

DIVIDEND BY THE ISOLATED COMPANY. The Edison Company for Isolated Lightnag has declared a dividend of to per centum, payable lanuary 20th, out of the profits of the first year's business. It is proper to state that the Isolated Company has parted with none of its territory, and sold no territorial rights, the profits on the first year's business having been earned exclusively from the sale and installation of isolated plants. Tempting offers have been received from parties desiring to purchase territorial rights, but the policy of the company during the year of its existence, has been to retain all its territory, pending at least a partial development of the commercial value of the business. The profits, therefore, do not represent any receipts from the sale of territory or licenses, or any receipts from the profits of manufacturing, but they represent solely and exclusively what has been made by selling and installing dynamos and lamps for isolated incandescent lighting. It is said, and we believe truly, that this is the first time a dividend has ever been declared by any electric light company from the profits of selling machinery and lamps, exclusive of profits derived from manufacturing, and the sale of licenses or territory.

EDISON FACTORY LIGHTED. FRANCE. The Société Industrielle et Commerciale Edison have installed a plant for lighting their own works, consisting of one K dynamo and 400 A and B lamps. This factory is now in full operation turning out dynamos, lamps, &c., for Installing Edison plants in France. and in other parts of Europe. It is located at Ivry-sur-Seine, usar Paris.

Committee of the Commit

William Knabe & Co.:

"Enison Entertric Lands, --Several departments of the Meses, Win. Knabe & Co.'s plane manufactory, Enlaw and West streets, were lighted last Ritarie & Co.'s pane manuscenty, many There are 150 lamps in all, about 125 of which are movable for a distance of twelve feet in any direction. Heretofore the departments have been closed early, as gas was not used for lear a lighted match might be thrown by accident where it would do damage, but now the men will be able to work later, and thus benefit themselves as well as their employers, as many of them work by the piece. As is well known. This SEN DOOR BUILDING was the first in Maryland to make use of the new light, Then followed Mr. Jas. A. Gary's unit at Elysville; then Wm. Knabe & Co., and now arrangements are being made to introduce it into the Mr. Vermon Company's mills at Woodberry.

TESTIMONIAL FROM FACTORY PLANT AT LENNI. The following testimonial has been received relating to the plant installed at Lenni, mentioned in the last Bulletin:

"PHILADELPHIA, December 2d, 1882.

TO THE EDISON COMPANY FOR ISOLATED LEGISTINGS In reply to your enquiry as to the Edison Electric Light you metallied at

the Park Mount Cotton & Woolen Mills, Lenni, Pa., I would say they give us the fullest satisfaction, and are every way up to your guarantee for light and officiency; and although we have been running several weeks we have not yet broken a single lamp.

The guarantee you made as to the power consumed is also more than horne out in practice. We do not feel the power used by your dynamo. TOTAL BURSLEY

Secretary and Tenamen !!

NEW BEDFORD. GRINNELL MILL PLANT. An order has been received from the Grinnell Mill, for a plant consisting of three K dynamos and Soo A lamps to be installed in their cotton mill at New Bedford, Mass.

PHILADELPHIA. WOOLEN MILL PLANT. An order has been received from Messrs. Clark & Keen, for a plant of one K dynamo and 200 A lamps, to be installed in their woolen mill at Philadelphia, Pa.

ERIE, PA. MACHINE SHOPS LIGHTED. We have received an order from the Steams Manufacturing Company, Erie, Pa., for a plant consisting of one L dynamo and 150 A lamps, to be installed in their machine shops.

MR. WOODBURY ON THE EDISON LIGHT AT HOLYOKE. The following extract from the Holyoke Transcript, October 28th, is of interest touching the economy of the Edison light:

"At a meeting of tire Manufacturers Mutual Insurance Co., held in Boston last Wednesday, Mr. Charles J. H. Woodbury, a mechanical engineer of much prominence who is retained as an expert by that company, read an exhaustive paper on electric lighting, a portion of which is of much local interest.

Mr. Timothy Merrick, of this city, authorizes him to give the facts respecting his experience with the Edison. System in the Merrick Thread. Company's mill No. 3. This mill runs all night, five nights in the week for 51 weeks per year, using flight 2,865 hours per annum. It was lighted by 95 humers with city gas, co-ting \$2.13 nst, which amounted to \$225 per month. Ninety-free Edison II humers (eight candle-power) were substituted for the gas. but he first 1,000 hours five imprearisons had broken, and October 20 they

100 famps, at \$1.00,		-							٠		٠		\$190
interest and depreciation							·			٠			153
6 horse power, at \$10,00		•	•	٠		٠		٠	٠		•		60
Annual cost of Edison He	·ht.												\$40
Monthly " " "									٠		٠		33
Monthly cost of Gas, The results from the					٠					•		٠	22

normal capacity.

The Holyoke Water Power Company furnishes water-power very cheaply; and the result may be interesting if we hold the Edison Company to their

minimum guarantee, and also charge the dynamo with four pounds of coal per hourly horse power:

4.78-100 renewals of 95 lamps	 pa	١, .	154	h	ne j		4 5	1.0	ю,					\$154.6
Interest and depreciation,		٠						•		٠				153-0
30.74 tens of coal, at \$5.75.	٠		٠		٠		٠		٠		٠		•	176.8
Annual cost of Edison light,														\$784.3
	•						٠		٠					2,700.0
Mouthly cost of Edison light,		:		•		•		٠		٠		٠		65.3

The mill is situated, says Mr. Woodbury, sat the base of a high bank and is only eleven feet, six inches lettween floors, so it is very had in summer, and Mr. Merrick informed me that it would have been impossible to run the mill nights during the extremely had season has summer if the help had been valifiested on the heat and withdrad are from the larming easy.

Specifying of ingrecoments Mr. Woodbury says that they will certainly come, but will produce the attachments eather than to be more permanent, but will produce the attachments eather than to be more permanent of the plant of the attachment of the plant of the produce that the produce of the certainly only the state of produces in owned by the sail Mantal Instance. Our companies, have cauche first to the given no measure of our cares thy an incanderent system, and it is positively averted that no fore or injury to person has over here cauched jury as Edison species.

In conclusion Mr. Woodbury said 'Electric lighting should be encouraged on account of its inherent qualities of safety. Any system that is in conformity to the insurance regulations is also in the best condition electrically."

GHENT, BELGIUM. A plant of one Z dynamo and 60 A lamps has been installed in the offices and works of Messrs. De Smedt and d'Hanis. Ghent.

ADDITIONAL PLANTS SINCE LAST BULLETIN. The least Bulletin comincial a list of all our lookined Plans in the United States up to that date. There were 123, aggregating 21.998 hmps. ly mistake one plant was omitted from the list, that of the Merrick Thread Company, Mill No. 2, 140006e, Mass., one K dynamo and 56 li lumps. Since the date of the last Bulletin, October 14th, we have received orders for 29 additional plants, aggregating 6, 566

lamps. We have also received orders to increase 5 plants already installed, the aggregate increase of lamps being 338 lamps. The total number of isolated plants up to the date of this Bulletin is 153 plants, 29, 192 lamps. The lift given below constins the Merrick Thread Company's plant, mentioned above, also the orders for in-

stallations received since the date of the last Bulletin. POST Service Control NUMBER v.com AUTODOS DESINTES. LAMPS John S. Adams. C. Pendergh, Pr. Se "Kas Adams".

American Espress Co. New York City. Express Co.

Heyword Bress, R. Co. Gardner, Mars. Chile Therapy.

Mount Verson Co. Bilinese, Md. Cones Mills. Heywood Bron. R. Co. Gardner, Mass. C. Sar Fischery, Monta Yernon Cox. Baltimore, Mil. Cuton Mills.
Fire, Bases & Erleen. Philodolphia, Pa. Worsted Mills.
V. S. Millstey Academy. Wirst Fedal Aladomy. Whitney & Completi New York City Paper Burgage..... R. V. McAden Lawell, N. C. Consu Mil. Albien Paper Gu. Holyoke, Mass. Paper Mill. Arnold Print Works....... North Adams, Mass. Print Works...... Amidd Print Works | Akron, Olds | Spart Bands |
Bay Star Sagar Refuser | Boun, Mars | Sagar Refuser |
Light & Force Co. | New York Cer | Sozgar Butterfet |
New Orleans La. | Bett | 60

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SANTIAGO, OHILI. SMALL CENTRAL STATION START-ED. The local Edison Company at Santiago, began November 4th, to furnish light to subscribers. The start was made on that date with an equivalent of 150 A lamps which were increased within the next few days to 200, exclusive of the lamps in the station. The current is at present distributed over two main conductors, one 650 feet in length, the other 425 feet. The lights are distributed among twelve dry goods stores, five large commercial houses, a large cafe and billfard room, and several other shops. Mr. Stewart writes that he is running three Z dynamos to supply the light and that thous sands of people have visited the station and the buildings where the lights are placed. He states that all the subscribers to the light are satisfied, that he is unable to supply fixtures as rapidly as consumers require them, and that the local press is enthusiastic in praise of the enterprise. The local gas company has supplanted the old gas burners with new ones with an enlarged capacity, free of charge, but the public sentiment is largely with the Edison light.

TESTIMONIAL FROM THE WAMSUTTA FLANT, NEW BEDFORD. The following testimenial from Mr. Killurn relating to the large Estions isolated plant now in use in the Wamsutta nills, is copied from the Colon, West and From and Baston Journal of

"In answer to an inquiry as to the result of the introduction of the Edison system of electric lighting in the Wanisutta Mills, we have received the following letter:

WANSUITA MILLS,

NEW BEDFORD, MASS., Nov. 10, 1832.

The Ridion system of electric lighting was introduced into our No. 6 mill. Sept. 14, 1852, and has been in constant me ever since that date, lighting the earlier mill. The plant cost about \$12,000 at costsist of three K dynamos, so called, each of the capacity of 29.0 A lights of the called power each, naking a total of 250 lights. The lights are so arranged that one will light four fooms, giving an equal amount of light.

s. The lights are so

to each loom. We formerly used two four-foot gas hurners for the same purpose. In other parts of the mill the arrangement is such that one bump lights about the same space as two four-foot gas hurners. The whole system from the word go has moved along without a hitch of any name or nature, and is giving entire satisfaction. We like it for several reasons. It is a better light than gas; it is as cheap as gas at \$1 per 1000 feet ; there is no smoke or heat from it ; it is safer than gas ; and, best of all, it does not vitiate the air we live in-for this reason alone we should use it, if it cost more than gas. The dynamos are operated by one of our machinists, requiring but a small portion of his time, say an hour and a half per day for the year. The power required is, by actual test, one horse power for 8.6 lights of 16 candle power each. The lamps are guaranteed to last 600 hours; and, as a well constructed mill requires light but about an hour per day, or 300 hours per year, the lamps would last two years. The cost for power, taken in connection with the power to drive our mills, is very light, at the night end of the day. We are unable to detect any increase in the consumption of roal, but the fires are probably burned a little lower; therefore, from this data, I should compute the cost of lighting our mill, which contains \$1,000 spindles and 1,072 forty inch looms, as follows, putting the power at \$30 per year per horse power :

> Yours respectfully, EDWARD KILBURN, Agent."

Referring to the testimonial of Mr. Kilbura, the following is an extract from an editorial notice which appeared in the Cotton, Wood and Iron and Boston Journal of Commerce:

Showing \$74 in favor of electric light with gas at \$1 per thousand

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LAWRENCE. SMALL CENTRAL STATION PLANT. The Edison Electric Illuminating Company of Lawrence, Mass., have purchased ground for a central station and are putting in a small plant for central station lighting, susceptible of subsequent enlargement as the business developes. We hope to give a detailed account of this plant in the next Bulletin,

INSURANCE COMPANIES AND OUR LIGHT. The following extract is from the report of the Board of Directors of the Edison Electric Illuminating Company of New York City made to the Stockholders at the annual meeting, tottching upon the satisfactory and agreeable relations existing between that Company and the Insurance Companies. It merits especial attention:

"It gives us great pleasure to make a formal recognition of the courtesus and intelligent manner in which our local Board of Underwriters have discussed and treated the subject of the wiring of boildings by our Company for electric lighting. The fact that we were wiring many hundred buildings in a single section of the city for the purpose of lighting them by our system, necessarily rendered the question of how the work should be done so as to avoid the danger of fire, one of great importance for the underwriters to determine. The entire novelty of the subject, together with the fact that no precedents existed and no rules had ever been propounded anywhere in the world to meet the emergency, made the matter one of still greater delicacy and difficulty. It was however admitted from the first that the interest of the underwriters and of ourselves were identical. Both of us wished to avoid fires. Fires in the one ease would entnil losses upon insurance companies, and in the other would create a prejudice against electric lighting, and we felt very deeply

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that in the introduction of such an entirely new system of artificial illumination, any prejudice of such a nature would be highly injurious. Mr. Edison had, however, from the beginning of his inventions in electric lighting, developed his system with an especial eye to its safety from fire. Accordingly we took especial pains to point out this fact to the Board of Underwriters and to endeavor to obtain from them and their experts a full and unbinsed examination of the merits of our system in this regard. The intelligence and fairness which they brought to the investigation of the details of our system, were met on our part by a full and free disclosure and explanation of everything connected therewith. This resulted in the adoption of certain rules by the Board of Fire Underwriters, which have now become the standard rules in the matter.

In our First District in this city, the Board of Underwriters required that in every ease a special inspection of buildings should take place before they were lighted. Accardingly, whenever we have made connections between our street mains and the interior wires, and before turning on the current, we have always notified the Inspector. In no cases have we been subjected to any troublesome delay by him or by any other of the insurance officials, and the rapidity with which we have been enabled, week by week, since the plant in the First District was started, to connect boildings and start the light, has been owing in no small degree to the fact that, although the inspections have been rigid and thorough, they have always been made with promptness and dispatch."

ISOLATED COMPANY. CIRCULAR ISSUED BY DI-RECTORS TO STOCKHOLDERS. The Directors of the Edison Company for Isolated Lighting have issued the following circular to the stockholders, relative to the recently declared dividend and the proposed increase of stock, and copies have been mailed to every stockholder:

"THE EDISON COMPANY FOR ISOLATED LEGITING,

65 Fifth Avenue. New York, December 6th, 1882

The Board of Trustees are pleased to be able to inform you that the busisess of the company for the first year of its operations has been very satisfactury. The early part of the year was necessarily occupied in preparation and canvassing, so that it may be said that the profits have been realized largely within the last six months, and notwithstanding the expenses incident to the organization of a new industry, the net profits actually carried up to the end of the present year, warrant the Haard in the declaration of a dividend of ten per centum on the Capital Stock of the company, which has accordingly been re-

The company has been somewhat embarranced, even in this fits for party plan buildings on a decidable for large-cardino of lab lags, and constantly increasing loutines. The large amount of work at all time in progress and prefer with the test of Dayman, Englance, and their materials recorded a constant of the contract of Dayman, and their materials recorded a large amount of money. The threat is fully satisfied that to unable the alarge amount of money. The threat is fully satisfied that to unable the analyse accessing several manying exceeding respectively. Whether the first relation had use of the power accessing work of the probability of the probabilities in parameter of the motion between the restriction and use of the power accessing work of the Probabilities in parameter of the motion between the restriction of the probabilities in parameter of the material beautiful adults. In one of the probabilities in the probabilities in the probabilities of the prob

Of the increased stock 51 per cent. (\$255,000), will be issued to the Edison Electric Light Company as provided in the contract between the two Compandes, and the remainder, 49 per cent. (\$425,000 will be offered for subscription at pur to the Stockholders of record at the closing of the baoks, on the 4th of January rust.

The Transfer looks will be closed at the Central Trust Company, on the 23 linds, for the meeting of the Stockholster, and remainclosed until Tuesday the 24 day of jamaray, when they will be re-opened for two days, Chois, on the alternous of the 4th of Jamaray, and Stockholsters of record at the last smend date will, if the increase of Capital is authorized at the Stockholster, meeting, be entitled to subscribe for our adultizant share of Stock for each start of the present Capital Stock standnies in their names at that time.

The transfer books will be re-opened or Monday, January zzd. The option to subscribe to the increased Stock, will remain open to Stockholders of record at the closing of the books, on the ath of January, until the close of business on Webnesday the toth of January. Any amoonts not them subscribed will be disposed of as way be directed by the Board of Trusters.

The terms of sobscription as fixed by the Board of Trustees requires the jusyment of fifty dollars per share, at the time of making such subscription, the remaining fifty dollars per share to be soliject to the call of the Board in such sams and at such times as it may determine.

Forms of subscription will be sent to each subscriber lunnediately after the closing of the looks, January 4th.

If you cannot be present personally at the meeting of the Stockholders on the 30th list., please sign the enclosed proxy, have the same witnessed and return it to the undersigned before the day fixed for the meeting.

By order of the Board, C. GODDARD, SECRETARY."

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ANNUAL MENTINO OF STORMEDINER OF LIBERT OF CONTAINS. OFFICIAR SILECTOR. DIRECTORS PROPER SILECTOR DIRECTORS PROPER SILECTOR DIRECTORS PROPER DIRECTORS PROPER DIRECTORS PROPER DIRECTORS PROPER DIRECTORS PROPER DIRECTOR SILECTOR DIRECTOR PROPERTY OF THE SILECTOR DIRECTOR PROPERTY OF THE SILECTOR DIRECTOR PROPERTY CAN'T DIRECTOR PROPERTY CAN'T DIRECTOR DIRECTOR SILECTOR DIRECTOR DIRECTOR SILECTOR DIRECTOR DIRECTOR SILECTOR SILECTOR DIRECTOR DIRECTOR SILECTOR SILECTOR DIRECTOR DIRECTOR SILECTOR DIRECTOR DI

The following extracts from and reference to the Report of the Board of Directors submitted to the meeting are of interest:

"Since the last annual meeting the stock of the company has been increased of the per contenn, namely, from four humerical and cipicy thereard observed seven hundred and tercuty thousand delites. This furrors was recommended by your Bushad, Jamary (th, 1882, and was approach at a special meeting of the Stockholders, called for the purpose, Jamary 31st, 1852. Only skey per centum upon this increased stock has been called a

The report uset refers to the license granted to the Edison Electric Illuminating Company of New York, also to the satisfactory progress being made by Mr. Edison with the Electric Railway at Menlo Park, and to the progress being made in lighting railway trains. The report then goes our as follows:

"The ishated luminess and the lighting of attainably were two selects on which expectations was catelled in the att and rejects. It was existen that a fixeg amount of expelial would be required to describ the like the large amount of expelial would be required to describ the like the trainer and expelial as a new emmapse with heaptleast expelial would have to be formed. There was strong objection on this part of severe (1) our limit against a selection of the large and the

(125)

As a substitute of a march of the march of the contract of the

Notwithstanding the great expense attending the inangoration of such an entirely new basiness a handsome dividend has already, in the first year, been earned by the Isolated Company from the sale of machines and lamps, and the future of the business is succeedingly promising.

Variant to a reciding of your Road pased November agh, 1881, againing a committee to comer's with a committee from the Craiman Exertical Company founding the expectation of this company joining that enganization, and the contracts between our exceeding a first expectation of the company, and the contracts of the company, and the contracts of the company, and the contract of the company of the contract of the Craiman Contracts of the Committee Company, and the contract of the Craiman Contracts of the Committee Company, and the Committee Company of the Committee Contracts of the Committee Company for the Committee Company for the Committee Company for the Engineery, but make some of the committee Committee Company for the Armonistic conflicting conflicti

Indied, the past year a number of electric light conquisite have used not constructed our company for consolidation. In some cases thinly have sought to edithed patients to us out and nell; in others to exchange ferouses. There were contracted have a long out to be contracted and the contracted have been also as the contracted have been also as the contracted have been desirable and the contracted have be

Here follows a list of the subonfinate companies to which the Light Company has granted licenses, together with a satement of the general policy of the company touching the formation of subordinate companies, to the effect that insaments as the Edison Patents on incandescent lighting give to the Light Company a monopoly of the business of incambeceut lighting, and inasounch as the lonitures has not yell tens to fully developed at so teathle the company to correctly determine the value of a license for any given locality, the general policy of the company, to which only a few exceptions have been made, has been to postquee for the present the granting of licenses for specific localities and the formation of substillance companies for specific localities and the formation of substillance companies to work such licenses. The report then species of the installations of the experimental village plant at Roselle, New Jeney, now being installed, and then concludes as 6 folioss:

"The functed combine of the company foully est dead in the Trust very repet necession similated. How that the fine (the p-tay reflex in come of the company has extend the unitary, and that a lottice is careful in come of the company has extend the surface, and that a lottice is careful in the surface of another repet to the company, a path is the girls for access playing the expense of another repet necessary and concernative policy adopted in the management of the leastness of the company, a paley which has not then intended to even intended the company has the company as the product of the company as the company has company because the company has company to the company has company to the company that the company that the company has company that the c

ANVAL MEETING OF THE EDISON ELDORAGE LLM-MINATING ODMERAN'S OF HIM YORK GIVE, DIREOTORS REPORT, ELDOTOR OF OFFICERS. The second annual meeting of the Stockholders of this Company was held at No. 65 Fifth Avenue, December 11th. The fightwing foliers and Directors have been elected for the ensuing year; President, Norvin Green, Fuc President, N. II. Zakon; Transarre, E. P. Falbri, Secretary, Calvin Godhadt, Birccton, Norvin Green, S. R. Exun, Thomas A. Galliway, J. Hood Wright, G. P. Lowey, J. F. de Navarre, E. Falbri, Game H. G. P. Lowey, J. F. de Navarre, E. Falbri, Game H. W. H. Medslewerth

"

"Since the last annual report the installation of the First District has been completed, and on September 4th the plant was started, event has created wide-spread comment in both scientific and financial citcles. In view of the fact that it constitutes the first attempt to distribate electrical earrent for lighting and other purposes, over a large area, from a central station, and in view of the further fact that it is but a short time since the highest scientific authorities in the world pronounced such an attempt not only impracticable but also impossible, the actual starting of the plant in the First District awakened the deepest interest. It is therefore with great satisfaction that your Board congratulate you upon the successful opening of the First District, and upon the bright prospects for the future of the Company's business of electric lighting in this city, rendered possible by the success thus far attending the Pearl Street *** Soon after the last annual report, that is to say, about the last of December, the laying of the underground mains was suspended on account of had weather and the freezing of the ground. For nearly two months, in consequence of these obstacles, but little progress was made with the underground conductors, but about the last week in February work was resumed and before the end of June the street mains were all laid. The wiring of houses in the First District was completed in February, when 946 houses had been wired with a capacity for 14,311 lamps. These places thus wired were distributed throughout the First District as follows: Spruce street, 12; Ferry street, 4; Peck slip, 4; Beekman street, 107; Ann street, 31; Fulton street, 166; John street, 73; Builing Slip, 1; Platt street, 8; Maiden Lane, 78; Liberty street, 19; Cedar street, 36; Fine street, 28; Wall street, 56; Park Row, 3; Nassau street, 68; William street, 97; Gold street, 10; Dutch street, 4; Cliff street, 9; Pearl street, 43; Water street, 19; Front street, 46; South street, 24.

. . The underground conductors were proportioned to distribute the maximum current to be generated by the full power which the station will be capable of producing when its equipment shall be fully completed and are ample for that purpose, but your Board was of the opinion that the most prudent pulicy was to finish only one of the two buildings in the first instance. They thought that the experience gained in the installation of the apparatus in the first building might possibly suggest some improvements which could be availed of in equipping the second building The plant so far creeted at the Central Station, 255 and 257 Peatl Street, consists of six steam dynamos, with the necessary boilers and appllances for regulating and controlling the cutrent. The engines attached to the (415)

os have each a normal capacity of 125 H. P., and a maximum of 200 If. P., making a total maximum capacity of 1,200 II. P. The steam dynamos weigh 30 tons each, making the aggregate weight of the six 180 The total net-work of undergranni conductors is 95,000 feet, including males on all the block froms, street intersections, bridge interscetions and feeders. The plant in the First District, as stated above, was started, and the District lighted up for the first time at 3 P. M., Septemher 4th. Since then the Station has been running day and night without stopping. No serious obstacle has been met with and, except as regards a single defect connected with the steam engines, no unexpected trouble has

arisen. The result of Mr. Edison's part of the work, namely, the electri cal apparatus and everything appettaining thereto, has exceeded our anticipations, the only special trouble having been caused by purely mechanical matters, chiefly the regulation of the s'east engines. In this respect we have experienced no little disappointment. *** In the last annual report mention was made of an investigation

on the part of a Committee of the Board of Underwriters, touching the safety from fire of the Edison system of electric lighting. Since then rules have been adopted by the Underwriters governing the wiring of buildings for electric lighting. These rules were not promulgated until after we had finished the wiring of many of the buildings in the First District, but since they were promulgated the rules have been strictly complied with. Regarding the buildings wired before the sales were published, the Board of Underwriters have in most cases approved the

wiring as finished before the rules were adopted, thereby recognizing the intelligent and successful efforts on the part of our wising department, even before the Underwriters had thoroughly discussed the subject to wire buildings in such a manner as to be free from all danger of tire.

* * * The total number of buildings connected in the First District up to this date is 226, wired for 5,013 lamps, of which 2,976 are in regular use. When the First District was lighted up no charge was made for the use of the light. Your Directors were of the opinion that owing to the inequality of the light, resulting from the imperfect governing of the cugines, an charge should be made until the station was running light satisfactorily to our own engineers. For the last few weeks, however, this irregula tity has been substantially removed, and we have accordingly now began to charge. It is the present intention to make the bills for the light payable monthly, as is the custom with gas bills, and to make the charge on a basis of one dollar per thousand eandles, which is equivalent to about the present price of gas, (\$2.25 per thousand feet). Regarding the selling of power in the First District, Mr. Edlson is now engaged in constructing motors of different sizes. We expect a large demand for power and now that selling of light has been successfully statted, especial attention will be

ren to equipping the District with facilities for furnishing power. The light having now freen in use over three months in the First District consumers have had sufficient experience to qualify them to form a correct opinion as to its merits. We have made especial efforts to ascertain what these opinions are, and both through the employees of the Company and through others who were total strangers to the consumers, we have endeavored to ascertain how the light is liked. There has been but one response. The consumers of the light are unacionous in the opinion that It is entirely satisfactory and that it is in all respects superior to gas, or any other illuminant. So strong are the expressions of opinion in this respect that we already begin to feel that the only possible mistake made in the First District is that the installation will be found to be too small, that is to say, that the completed plant, large as it will be, will prove too limited to enable us to furnish all those who wish to become nur eustomers. As regards the equipment of the second building at the central station no arrangements have no yet been made. The policy of your Board in this respect has been to defer beginning work on the second building until the plant in the first building shall have been run and taxed up to its maximum for a sufficient length of time to furnish reliable data, based on experience, touching both the scientific and the financial questions involved. The soccess of the station during the period which it has been run, now exceeding three months, satisfies us, however, that there is no longer room for doubt touching these questions, and that, (possibly) at an early date. It will be found prodent and desirable to go on with the installation of the second building.

In the last annual report a list was given of the isolated plants then installed or in process of installation in this city. Some additional installations have since been made. A list of all these isolated installations in New York City, including those mentioned in the last annual report, is as follows: Hinds, Ketcham & Co.; Nathan & Dreyfus; Manhattau Railway Co.; New York Herald Building; E. S. Jaffray & Co.; H. K. & F. B. Thurber & Co.; American Bank Note Co.; J. Pierpont Morgan; Hotel Everett; Professor Henry Draper; Max Ams; Altken, Son & Co.; Everett's Hotel; American Express Co.; B. Fischer & Co.; and Whiting & Campbell. Some attention has been given to deciding what will probably be the next district to be lighted in this city. The decision reached has thus far been in favor of what is known in our Engineering Department as the Twenty-Eighth District of New York City, namely, the area bounded by Twenty-fourth and Thirty-fourth Streets, and Madison Avenue and Eighth Avenue. A careful canvass of this district has been made. It shows that it presents a singularly attractive field for electric lighting. Whereas the number of gas jets in the First District is about 18,000, the number in the Twenty-Eighth is near 44,000,

and the number of sevining machines in the "Twenty-Eighth District is 2,000 many of which will probably become contensor for proce." The other details of the casess of the Twenty-Eighth District are equally encourage as regards the eight eight eight and the cases of the Twenty-Eighth District are equally encourage as regards the either field presented in that eighter for on electric Hight plant. After the First District shall have been completed in all list deaths, and its necess that electrically and financially fully established, deaths, and its necess that electrically and financially fully established, necess test pattern by the Cost, but the seas very taken by the Cost, but the substitute of the cost test in the Twenty-Eighth District.

In choige this region your Band devire again to ensure to the Seckedbellers their stores compression was the wassered in-Statishion and starting of the First District. From our experience then for in connections with the extent among of that District, for a priori low exceeding exceeding the property of the starting of the property of the categories certain development of the Editors system of exterit jelging, experience certain developments which Mr. Editors have receipt under, will open an attencine field for leveriment for the purpose of externing types and attencine field for leveriment for the purpose of externing the Editors approach of Editors (1998) and the Propose of the Contraction of the Contra

ANNUAL MERTINO OF ISOLATED COMPANY. DIRECT.

ANNUAL MERTINO OF ISOLATED COMPANY. DIRECT.

AND REPORT. OF OFFICER BELDEDT: The first small mesting of the stockholders of the Edison Company for Isolated
Lighting, was beld November 1914, so No. 65 Fifth Averany

York. City. The officers and directors elected for the custing

yor, are as follows: Problems, 8, II. Batton; Secretary, Calvin

Goddard; Treasure, R. P. Fabbri; General Managor, M. P.

Moore; Directors, Thomas A. Edison, S. R. Eaton, Cyclin Goddard,

Edward II. Johnson, E. G. Fabbri, M. F. Moor, and W. H.

Mentalerzon.

The following extracts are taken from the Report of the Board of Directors, submitted at the meeting:

"When this company was formed n year ago, the lustices of bolisted lighting was entirely underveloped, and no date existed whereity the future of velopment of the business could be forestedd. A) that their Mr. Eddow, was making but one size of foolated dynamo, namely, the Z dynamo; we had no critished sector engine; the humanerable details relating to hatalilation, such as

One of the first things slone by the Company, after its business had been systematized, was to take up the subject of procuring additional dynamos, be sides the Z dynamo; also suitable engines. At a neceting of the Board of Directors, held January 26th, 1882, the subject of additional sizes of dynamos was discussed, and arrangements were made with Mr. Edison for the construction of experimental dynamos of additional sites. The result was the production of two commercial dynamos, in addition to the Z slynamo, one being known as the L or 150 light dynamo, and the other as the K or 250 light dynamic Arrangements are now being made for the construction of a still larger dynamo for isolated lighting, probably one of 350 lights.

Regarding engines, great difficulty was experienced in obtaining an engine adapted to our especial needs. The engine which was the first to be tried, proved unsatisfactory. After much testing and discussion the engine finally adopted as the one best suited to our business, was the Lawrence engine, soannfactured by Armington & Sines, at Lawrence, Mass. During the year that firm has moved its business from Lawrence to Providence, where a substantia company has been formed to develop their engine business, and although our Company is now taking the entire product of the machine works of that company, we are still unable to get engines enough to supply our order

The policy adopted by our Company at its start was to call in only a small amount of money, and to develop the business, until it had passed its experimental state, only on a limited and economical basis. This policy was rigidly adhered to. Installments were called in only as fast as the necessities of the lausiness, viewed from a conservative stand point, required. The growth of the business, viewed from a conservative status point, required. I ne growth of the business, however, has been so steady and reliable, that the entire capital has now been called in, and is being safely and profitably employed in the business, and additional capital is needed.

The business of the Company for the past year, up to November 19th, has amounted to 137 installations of isolated plants (of capacitles varying from 15 to 800 lights, respectively), in mills, factories, hotels, steamships, trempaper offices, dry goods stores, &c. The aggregate of the lamps in these 137 installations is 25,426. Most of these plants are in factories, but many are on steamboats and in newspaper offices.

The newspaper offices lighted with Edison plants are the New York Herald, the Philadelphia Ledger, the Philadelphia Record, the Ohio State Journal, the Boston Herald, the Baltimore Sur, the Davemport Gazette, and the newspaper and printing office of Weed, Parsons & Co., Albany, N. Y.

The light has proved itself a valuable means of artificial illumination for newspaper work in all its branches, chiefly on account of the steadiness and non-heating quality of the light.

Lighting seamships promises to be quite an important and profitable branch of our business. The plant on the steamer City of Worcester, New York City, has given such sathfaction, that an order has been given for us to light the new steamer, Pilgrim, which is now being finished. We also lighted one of the beats running from Baltimore to Norfolk, and our light was so satisfactory that a similar plant was redered for another loat of the same line. We are now lighting a steamer on the Ohio River, and there is some prospect of considerable business in connection with lighting other strangers on the West-

Our light gives uniform satisfaction. We have received a large number of testimonials from our enstoners extolling its merits. But perhaps the best evidence of satisfaction which our plants give is the fact that not one plant which we have installed has been rejected. Indeed many of the plants have been largely increased, after trial. * * *

We should state that all our installations have been made on a strictly one price lasis. It has been the role of the Company, from which no exception whatever has been made, not to vary prices in any instance, but to maintain our published price list invariably. It may be that in a few in-stances orders have been lost by an adherence to this rule of business, but it is our belief that the business on the whole has been bourfied by a rigid adherence to the one-price principle.

A new and probably an important branch of the fature business of the Company descrees especial mention. We refer to the lighting of small villages and non-gas towns by small central stations. An experimental plant of this description is now being installed at Roselle, N. J., at the joint and equal experse of this Cotopany and of the Edison Electric Light Company. It is expected that this village plant will be started during the month of December of this year, and should it prove as successful as anticipated, the leasness of lighting by village plants will form perhaps the most important leanch of the future business of our Company. When we look back and note the progress that from a small beginning has been made during the year in isolated lighting, we may reasonably expect that the coming year will show not only a large increase in that class of husiness, but that the husiness of village plants, provided the Roselle installation succeeds, will develop with equally steady and rapid success

Our Company has not as yet parted with any of its territory, but still re-tains all originally purchased from the Edison Electric Light Company, namely, all non-gas towns, villages, &c., in the United States, January 1st, 1882. Nor have we formed or granted license to any subscillate companies.

Thus for our lustiness has been handled from the home office, through agents who represent us in soliciting orders and in looking after the details of our business. The regular local agents of the Company at present are as follows:

Mr. Fepreer Barden, in Nov. Baginsel; Nr. John Blecht, in Namer Namerjornich, Distructura and Western Nov. Johny 230: 16. C. Delitable in One-Compt Geological and Recomption of the Comption of the Control of the Cont

The object of increased explait reprice early attention. The present cipils of the Compay, excitely willised the basilisms up to the present time, it is indicated for each inmediate growth of business as we may reason time, it is indicated for each inmediate growth of business as we may reason using this expected in the present of the company of the present company of the present of the present of the present of the present in the present of the present of the present of the present which the present of the present of the present of the present most of on spiplic, including empirics and object on the object of the present which we have been applied as the present of the present most of on spiplic, including empirics and object of the forest work of the most of one spiplic, including empirics and object of the forest work of the company of the present of the present of the present of the Company, the present of the present of the present of the londows and was the present of the londows and the present successive of the londows and save carely sufficient capital for the present successive of the londows and was the present of the present successive of the londows and contains.

It is while proor pleasure that we congruidure the Company upon its percent prospurses condition and finate processing with the Company upon its perturbation of the control of one of the control of

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SIXTEENTH BULLETIN,

The Edison Electric Light Company,

65 FIFTH AVENUE, NEW YORK.

February 2d, 1883.

Three holletins, originally issued as a convision way of associng the inquiries of the property of the Company and of other holders, to give them information of the property of the Company and of other matters of greater or less interest connected with decirie lighting. Agents are particularly respectable to ensumedate to the President witherer perictial point of general interest may be developed by their experience in intalling or operating our lighting.

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FIRST DISTAION, NEW YORK GITY. The success of this plant is now established by sond question. It has been in sport day and night whitest stopping one minute since it was first started, September 4th. The only obtacted ever encountered, namely, the purply mechanical one of the regulation of the originate, has now been entirely overcome. The engines are running smoothly, the light is steady, and our customers are entirely sufficient.

We were lighting at the date of the Fourteenth Bulletin, October 14th, \$5 houses; at the date of the Filteenth Bulletin, December 14th, \$5 houses; and at this date we are lighting \$10 houses, wired for about 6,125 houses. All the buildings now lighted have been inspected by the Board of Fire Underwriter, and centificates authorizing the use of our light have been granted in every case additional connections are being made ship. Meters are used in all the buildings, and our bills for lighting, based on the amount of current shown by the meter as having been consumed, accurated the control of the properties of the control of the c

NEW YORK "TIMES" LIGHTED. The New York Times is lighted from the Pearl Street Station by means of a branch underground connection with our regular underground conductors the First District. The plant consists of 288 lamps, distributed as follows:

Composing	Room				-		-		119
Mailing	••			-					12
Press	**							-	77
Reporters	**	-							14
Editorial	**								27
Halls -									12
Offices					٠				31
			Го	tal.					288

The fixtures, prepared under special orders from the Times Company, were manufactured by Messra. Bergmann & Co. The success of our light in the Times Building is a good illustration of the entire success of our underground system, because the building is not only

at such a distance from the Central Station as to submit the earrying capacity of our conductors to a severe test, but being also located outside the limits of the First District, and beyond the borders of the net-work of conductors, special conductors had to be laid and connected with the system in a manner not originally contemplated. Everything, however, has worked perfectly, and the light is giving entire satisfaction. Several other newspapers have applied to be connected.

THE EDISON SUIT AGAINST THE SWAN LAMP FOR INFRINGEMENT, LONDON. The patent suit mentioned in the Thirteenth Bulletin, as having been commenced in London against the Swan lamp, is being pressed as rapidly as possible by the Edison Company. The fundamental principles of incandescent lighting are at issue in the snit. Thus far the matter has been brought before the English Court on two minor points, both of which were decided in favor of the Edison Company. The first was on the question of compelling the Swan Company to keep an account of their manufacture of lamps pending the trial, so as to afford the Edison Company a correct basis for fixing damages; and the second was on a question between the two companies touching the services of eminent counsel, claimed by both companies. On both these preliminary issues the decision of the Court was in favor of Mr. Edison. The Edison Company in London is devoting itself with great energy to preparing for the trial, and every effort will be made to have it take place as soon as the case is reached on the docket of the Court, probably this Spring.

THE UNDERWRITERS AND ELECTRIC LIGHTING. By request of the National Board of Fire Underwriters and the United Fire Underwriters in America, Henry Morton, Ph. D., President of the Sievens Institute, and William A. Anderson, Esq., of the New York Board of Fire Underwriters, have prepared a work on the Underwriters' requirements touching electric lighting. The title of the book is as follows: "Electric Lighting and the Underwriters' Standard Requirements in Reference Thereto with Instructions for the Proper Inspection of Electric Light Equipments." The work, which has been prepared with unusual care, is illustrated with cuts of dynamos and electrical appliances used in house lighting, and will at once prove a most valuable and instructive assistant to the various electric light companies and their workmen.

TESTIMONIAL FROM THE PARK MOUNT MILLS. LENNI. We have received the following testimonial regarding the plant mentioned in the Fourteenth Bulletin, now running in the Park Mount Mills, Lenni, Pa.:

"We have been lighted at the mill by the Edison electric light, 127 hours, since November 2d, 1882. We have burned out only two lamps in that time, but several taups have given out from other causes. We are much pleased with the Edison fight and value it very much.

> (Signed) THE PARK MOUNT MILL, fours BURNLEY:

Sec'ty, and Treas."

YVÄSKYLÄ, RUSSIA. SAW MILL PLANT. A plant of one E dynamo with 40 lamos has been installed in the saw mill of M. Johnson at Yväskylä, Russia. This is probably the most northerly Edison plant in the world, the town being situated between the 62d and 63d degrees of latitude.

It is interesting also to note in this connection, that the common council of Yvāskviā, which is a town of 2000 inhabitants, have announced their intention of putting up a Central Station of 500 A lamps.

NEWTON, MASS. WORSTED MILL LIGHTED. We have received an order for a plant consisting of two K dynamos and 500 A lamps, to be installed in the mill of the Nonautrim Worsted Contragy, Newton, Mass.

THE "ELECTRICIAN" ON THE BRUSH STORAGE BAT-TERY. The New York Electrician in its issue of January, 1883, speaks as follows of the Brush storage battery:

"The recent exhibition of the Brush secondary battery in New York, has again attracted public attention to the general subject of the so-called storage of electricity. The information given in regard to the construction of this battery is of the most general character, and is entirely insofficient to enable us to form any intelligent opinion with respect to its movelty or efficiency, or as to its chances of commercial soccess. It is stated by Mr. Brush, and by those who have charge of the exhibition, that the battery consists of lead plates and the ordinary solution of acidulated water, and that the plates are prepared by some secret chemical process, by which greatly improved results are obtained. Very high efficiency is claimed for it in a general way, and those who are interested in it appear to be confident that it will prove economical and reliable in use. It is to be observed, however, that similar claims were made in regard to the Figure hattery and others, which have been before the public for some time, and, so far as we are able to judge from the best information accessible to os, none of these batteries have yet proved available for ordinary nse, and it appears to be the better opinion that the storage system will have a much more restricted field than its advocates claim for it. Such tests of the Faure battery as we have seen reported seem to indicate that a higher efficiency than 50 per cent, cannot be safely relied upon in practice. That is, only about one-half of the current expended in charging the hattery can be recovered in useful work, and even this efficiency would probably be consideralsy impaired unless the battery were used within a comparatively short time after charging it. Aside from the loss of current, the expense of the battery appears to be quite a serious item. Taking, for instance, the plant at ti Theatre des Varietes at Paris, it is stated that 265 Swan lamps are used, and are supplied by about 100 Faure batteries. The total weight of the batteries is stated to be 14 tons, 10 tons of which is active material. No sloubt, bu certain exceptional cases, such batteries will prove extremely useful, but, for general use in a system of distribution from central stations, we think the advantages have been largely overestimated. It is true that the conductors for distributing the current may be considerably reduced in size, but the cust of constructing and maintaining the secondary batteries would, in a large measureure, make up for this advantage, if not entirely counterbalance it. The

advantages chimed by way of revision; the capacity of engines and spanned not not not been considerably overatived. Desprive seven to be both on that on the constraint of the

ROTACT PAID IN ENOLAND UNDER THE EDISON PATENTS. THE DISON PATENTS. THE BRISH CHIEF CHIEF

SAN FRANCISCO. SUGAR REFINERY PLANT. A plant of one L dynamo. 150 A lamps, is being installed in the California Sugar Refinery.

CUBA. LIST OF ISOLATED PLANTS. Mr. A. Montamat, representing the Edison light at Havana, has furnished us with the following list of installations in Cuba:

te:

- (1). A plant of one Z dynamo with 52 A and 20 B lamps on the sugar estate "Esperanza," belonging to Don Felipe de Pelayo, sitnated in the Cardenas Jurisdiction, Cuba.
- (a). On the sugar estate "Socorro" in Sierra Morena, belonging to the Count of Casa Ibañez, a plant consisting of one Z dynamo with 61 A and 4 B lamps.
- (3). A plant of one Z dynamo, 3 A and tro B lamps on the sugar estate "San Lino," simated in the Jurisdiction of Cienfinegos, and belonging to Messes. Montalvo and Brothers.
- (4). A plant of one Z dynamo with 44 A and 40 Il lamps, on the sugar estate "Constancia" belonging to Messrs. Apesteguia, also simated in the Inrisdiction of Cienfuegos.

The plant in the "Louvre," also the plant in the Albisa Theatre, have been described in arcvious Bulletins.

OUR LIGHT AT WEED, PARSONS & CO'S., ALBANY. The following is taken from the Albany Evening Journal, January 9th:

"Moves. Word, Parsons, Ca., have just put up in their extending principal initial partial initiage, and inlineage and integraphic extrahilations to or Malions's principal manufacture of the limiting. The auditions are directly to the extended the initiality. The machines are directly to the state engles which moves the culties nearlierly of the exhibitionist. These hasps have been in service for executal weeks in the principal composition grown of the offices, and where given readire satisfaction to the composition. The fight is cleaver, greatly exceeds were desirable paid in the Patiliancy, and, by the sources of its adjustment, concerning paid in the Patiliancy, and, by the sources of its adjustment, concern

These large have been tested to stand a continuous strain of 700 hours or the equivalent of norre than two years of steady we where the average of night work does not exceed two or three hours a day. These lamps are distributed throughout the establishment as follows:

Engine room	
Boiler room	
Press rooms	
Counting room	1
Composing rooms	20
Bindery	17

Lithograph	n	ющ	١.,	٠.					٠.																									s
Excirctype	r	KOU	ıs,	٠.	٠.																													-
Railroad tic	tike	1 1	×	n.			٠.																											-
LAW Journa	al ·	લો	to	'n	п	n	m	ŧŧ	١.																									
Stereotype :	vas	ılta		**	2			ú	1	i		ì	Ġ	ì	1		١	•	۳	•	١	٩	•		۰	•	٠	•	•	•	•	•	•	ı
					٠,	ï		ï	-	•	•	ľ	~	ľ	•	•	•	•	•	•	•	٠	•	'		•	•	•	1	•	٠	٠	•	3

Several large work-shops and factories in this country and in Europe have adopted this system of illumination, but Weed, Parsons & Co's establishment is the first (except in Trask & Co's luminess office) where it has been introduced in this city."

STEAMSHIP LIGHTED. EXHIBITION AT GREENOCK, SCOTLAND. 'The following extracts are taken from the North British Dully Mail, Glasgow, December 1, 1882:

"On Saturday afternoon the magnificent new screw steamer Tarawera, built and engined by Musers. Demy of Dumbarton, for the Union Steam Company of New Zealand (Limited), was thrown open to the public at the Albert Harbour, Greenock. The steamer is lighted up with the Edison Incandescent System of Flectric Lighting, and is the first weel in this country to which this system of lighting has been applied. The number of lamps in the vessel is 150, and the driving power is supplied by a Botherhood 3-cylinder direct-acting engine. This engine drives the dynamo electric machine direct. The dynamo is of the size known as the "l." or 150 light machine. * * * The space occupied in the vessel by the generating machinery is 9 tect by a feet 6 inches. The lamps throughout the ship are of 16 carolle-power, and they are so arranged in the state resus, &c., that the light in each lamp can be turned off or on at pleasure by means of a tap similar to an ordinary gas cock. The simple turning on of this top lights the lamp. The "wiring" throughout the ship is done with a thin copper wire, covered with four separate coatings of insulating material, and at every point where the wires branch off to supply lamps a safety fuse is inserted. This safety fuse contains a piece of lead wire, which fuses immediately upon the addition of any excess of current beyond what is nominally intended to be supplied. Complete immunity from fire is thus secured. An exhibition of the working of this light was given on board the Tamwera on Saturday. The private view lasted from two till five o'clock, after which the vessel was thrown open to the public at a nominal charge, the proceeds to be handed over to the Green-ock Infirmary. For the private view a large number of invitations were issued to gentlemen interested in shipbuilding and the electric light, and, notwithstanding the extremely wet weather that prevailed during the afternoon and evening, the vessel was througed with lattics and gruthrases during the

time the relabilities locate. * * * The arrangement for Namenty', existing the same readment by Mr. C. T. Gasar, of the large Struck (Glagors, the Agent for the Efficient Cherte Lighting Company, and the practice and the same particular for the Efficient Ghresh was overable the charge of Mr. Marchardson and Company of the Struck (Glagors, the Agent Ghresh Cherte C

DOORS LIGHTED. PORTLAND, OREGON. The locks of the Gregon Railings and Navigation Company, Iverland, are lighted with Edition Imags. Mr. J. C. Henderson, the Consulting Engineer of that Company, nakes the following statement unclaing the companative merits of the are and incunderent systems, for lighting docks. He says than "ax to the relative value of the are and intendescent systems for lighting the several departments of the Company, he perfors the Edition for all offices and cowerd docks or buildings, for the reason that the lumps can be more readily distributed and thus give a much better and greater diffusion of light than it is possible to obtain from a limited number of an eligibat.

We are further informed by Mr. Houseron that the two systems of incandescence and are were experimented with on their docks, both of incandescence and are were experimented with on their docks, both at the same time, with a view to determine upon the most desirable light for the purpose of Huminatuing docks where freight was being insulated constantly identify the right. Mr. Henderson informs us that a great many mistakes were formerly made in trans-disposent of freight, which were directly transcales to the fact that the light from the are lights was no dizazing as to partially billion the clerks on the iterated lights was no dizazing as to partially billion the clerks on the iterated lights was no dizazing as to partially billion the clerks on the marks and numbers on the packages. For this reason, after a derivengt and practical test, it was decided to adopt the Edison

system for covered docks and offices, in preference to any known system of are lighting.

In this connection we are permitted to make the following extract from a recent letter of Messrs, Goodall, Perkins & Co., Agents of the Oregon Railway and Navigation Company:

"As our request, Engineer Van Duren throughly invosigned the electric light upseits and Portland, and thy comparing near we have constituted that the Edition light is preferable for the purpose of handling freight, over the are light. It is said that the are light is but to work by, that sometimes the eyes get in such conflicton that they are not well after to read marke, whereas, with the Edition light they are also be read market eye possibly."

THE "REPUBLICAN" ON STORAGE BATTERIES. The following intelligent criticism on storage batteries is taken from the Springfield Republican, January 14th:

"The system of storing electricity is not yet sufficiently developed to be of practical use, and it is very doubtful if it ever becomes of so great commercial value as its advocates prophesy. Various persons have from time to time announced the invention of storage batteries which could be used in electric lighting, but none of these have had other than scientific value. In the Faure system, for instance, forces are never converted at a loss of less than to per cent. Mr. Drush, inventor of the arc light, claims very high efficiency for his storage battery too, but like the similar derices, it has not yet proved available for onlinary use. M. Faure's batteries, as they are now constructed seem altogether impracticable, not alone because only half of the current used to charge them can be recovered, but on account of their cost. One hundred of these batteries were required to supply 265 Swan lauges in the Theatre des Varietos, at Paris, and their total weight was 14 tous. When Mr. Binish has perfected his storage butteries, he intends to introduce the are light into private houses, and claims that it will be powerless to harm the immates. This is all very well, but it remains to be done. The ordinary Weston and Brush an: lights, however, cannot be used for interior lighting without great danger to life and property, as events trave proved; for each light is acted upon by the whole force of the powerful electric current, which, coming in contact with -o good a conductor as the human body, can have but one effect. In Falson's Incandescent system which, it is claimed, answers all requirements and combines perfect illumination with entire safety, there is a return current from each lump, instead of a continuous current, as in the are system, which return-only when the last lump on the circuit has been reached. The electric current

manufacturation of the state of

in Edison's system is so feetile that the wires at any part of the system, and even the poles of the generator itself can be held in the bare hand without the slightest percentible effect."

BRÜNN THEATRE. This plant, mentioned in the last Bulletin, is running with great satisfaction. The following item is taken from the Vienna New Freie Presse, December (8th:

"The Union of Engineers and Architects went to Hritm to-day to visit the new theatre of that city, and above all to study its lighting. About 200 persons took part in this excursion, amongst them Vice-Fresident Pfaff, and the celebrated Architects Schmidt and Hansen. The Union was received at the Station by the Mayor and the professors of the Polytechnic School. In the evening the members attended at the performance, and expressed their entire satisfaction with the Theatre and its lighting by the Edison system."

MISSISSIPPI STEAMER "KATE ADAMS" LIGHTED. The plant on the steamship "Kate Adams," mentioned in the Fifteenth Bulletin, has been successfully started. The following account of it is taken from the Memphis Avalanche, December 21st;

"Those who were on board of this elegant steamer last night saw for the first time to this city the results of the labors of the wirard of Menlo park. Major Adams in fitting up his brag boat determined that the various modern improvements which contribute so much to our confort and pleasure should be embraced in her outfit, and chief among these was placed the Edison electric light for the illumination of her saloon and staterooms, * * * * The steadiness is what constitutes the great difference between the incandescent and the are systems of electric lighting. Wherever it has been introduced, those who are using it would not allow gas to again take its place, even if the cost of lighting by this system were greater, which we are happy to say is not the case. * * So economically is this light produced under this system, that where an amount of power is required shuring the day, the lighting by night, if necessary, can actually be furnished free of expense. * * * We congratulate Maj. Adams upon the enterprise which he has exhibited in being the first to place this beautiful light upon western waters, and upon a steamer which it will grace so admirably. Mr. Waters, who is in charge of the light, with much courtesy showed its simplicity to the many ladies and others who thronged the cabin of the peerless Kate Adams,"

HELSINGFORS, RUSSIA. PAPER FACTORY PLANT. A plant of one Z dynamo and 60 A lamps has been installed in the establishment of Mr. George Riecks, probably the most important factory in Russia for tapestry and fancy papers. This plant is n use from 8 to 10 hours each day.

Mr. Riecks recently said to our engineer that "the Edison light is more like sunlight than any other illuminant, and for mixing colors and making a distinction of all the finest tints it cannot be approached."

PHILADELPHIA, PA. LARGE CLOTHING STORE PLANT. An order has been received for a plant of one K dynamo and 250 A lamps, to light the clothing stores of Mesors, A. C. Yates & Co. 602 and 626 Chestuut St., Philadelphia.

MR. JOHNSON'S CHRISTMAS TREE. The following description of Mr. Johnson's Christmas tree, written by Mr. Croffut, is taken from the Detroit Past and Tribune, December 31st;

"Last esening I walked over beyond. Fifth avenue and called at the residence of Edward H. Johnson, vice-president of Edison's electric light company. There, at the rear of the beautiful parlors, was a large Christmas tree presenting a most picturesque and uncanny aspect. It was brilliantly lighted with many colored globes about as large as an English walnut, and was turning some six times a minute on a little pine box. There were 80 lights in all encased in these dainty glass eggs, and about equally divided between white, red and blue. As the tree turned the colors alternated, all the lamps going out and being relit at every revolution. The result was a continuous twinkting of dancing colors-red, white, blue, white, red, blue-all the evening, like the tree laden with lambent splendor that sparkles above the fountains in Aladdur's palace. I need not tell you that the scintillating evergreen was a pretty sight-one can hardly imagine anything prettier. The ceiling was crossed obliquely with two wires on which hung 28 more of the tiny lights; and all the lights and the goldins and fantastic tree stell with its starry fruit were kept going by the slight electric current brought from the main office on a filmy wire. The tree was kept revolving by a little tridden crank below the floor which was terned by the electricity. It was a superb exhibition."

PLANTS ENLARGED AFTER TRIAL. A gratifying evidence of the satisfaction given by our isolated plants is the fact that many plants have been increased after trial. A partial list of these plants is as follows:

- Seymour, Sabin & Co., Stillwater, Minn. The first installation was two Z dynamos and 250 B lamps, now increased to one K dynamo and 250 A lamps.
- (2). Danforth Locomotive Works, Paterson, N. J. The first installation was one Z dynamo and 60 A lamps, now increased to one L.dynamo and 150 A lamps.
- (3). The Pemberton Company, Lawrence, Mass. The first installation was one Z dynamo and 125 B lamps, now increased to two L dynamos and 300 A lamps.
- (4). The Merrimac Manufacturing Company. Lowell, Mass, has increased its plant from two Z dynamos and 250 B lamps; to one K dynamo and 250 A lumps.
- (5). The Merrick Thread Company, Holyoke, Mass. The first installation was one Z dynamo and 120 B lamps, which has been increased to one K dynamo and 400 B lamps.
- (6). The Wainsutta Mills, New Bedford, Mass, inserted a plant consisting of one Z dynamo and 60 A lamps, which has now been increased to three K dynamos and 750 A lamps.
- (7). Messrs, Weed, Parsons & Co., Albany, N. Y. The first inatallation was one Z dynamo and 120 B lamps, now increased to two L dynamos and 600 B lamps.
- (8). Mr. Max Ams, New York City, originally had a plant of one E dynamo and 15 A lamps, which he has since increased to one Z dynamic and 60 A lamps.

- (9). Messrs. Sayles & Washburn, Mechanicwille, Conn. The first installation was one Z dynamo and 120 B lamps, now increased to one L dynamo and 300 B lamps.
- (10) Messis. George Urhan & Co., Buffalo, New York, increased their plant from one E dynamo and t5 A lamps, to one Z dynamo and 60 A lamps.
- (11). Messes, H. K. & F. B. Thurber & Co., New York City. The first installation was one Z dynamo and 6o A lamps, first increased to two Z dynamos and 96 A and 80 B lamps, and again increased to one K dynamo and 250 A lamps.
- (12). Messrs. Norton, Brother & Co., Chicago, Ills., first had an E dynamo and 15 A lamps; now increased to one Z dynamo and 60 A lamps.
- (13). The Sibley Mannfacturing Company, Angusta, Georgia, have increased their plant of two K dynames and 15 2 Å lamps by the addition of one L dynamo, 150 kmps, thus making two K and one L dynamos and 600 Å lamps.
- (14). Messrs. Fiss, Banes & Erben, Philadelphia, whose first installation was one K dynamo, 250 A lamps, lawer doubled their plant by the addition of another K dynamo and 250 A lamps, making the total plant two K dynamos and 500 A lamps.
- (15). The Baltimore Sun plant, has been increased from an L dynamo and 150 A lamps to a K dynamo and 250 A lamps.
- (16). The Worumbo Manufacturing Co., Lisbon Falls, Me. The first installation was one L dynamo and 150 Å lamps, now increased to two K dynamos and 500 Å lamps.
- (17). Messrs, J. B. Stetson & Co., Philadelphia, Pa. have increased their plant from two Z dynames with A and B lights, to two K dynames and 500 A lamps.

18). The Eastman Dry Plate Co., Rochester, N. Y., have increased their plant from an E dynamo and 15 A lamps to one Z dynamo and 60 A lamps.

(19). The Davenport Gazette Company, Davenport, Iowa, has been using a Z dynamo and B lamps for many months past. This plant has been increased to an L dynamo and 150 Å lights.

N. N. PAIRHANNE & CO'S PLANT. L'ARD WORKS. 8T. LOUIS. A plant of 178 Å hanya is being installed in the Lard Works of N. K. Fairhanks & Co., S. Lonis, Mo. This plant is elsewhere mendooned in this lishletin, in connection with the list of plants installed by the Western Richon Light Company. It is outside of their territory, but special arrangements were made with that companys for his installation.

DRY GOODS STORE FLANT. DETROIT. A plant consisting of 173 A hasps is being installed in the dry goods sore of Messyn-Metcall Routers & Co., Detroit, Mitchigan. This plant is elsewhere mentioned in this Bulletin, in connection with the list of plants in-stalled by the Western Edition Light Company. It is outside of their services by the special arrangements were made with that Company for the installation.

THE LONDON "TIMES" ON THE EDISON LIGHT IN AMERICA. In view of the unfair statements about our business lately printed in many newspapers in this country, it is refreshing to read the following fair and correct article published in the London Time, January 5th:

"In New York, the central station in Pearl-street was opened on the 4th of the presenter last, since which date there has been no intermitation in the production of the current, either day or sight. The presence on the 20 miles of mains is constant and equal, and the adultions to the system average

something like for lumps per diem. The evanishtic simplicity of attention starting content did in superse ceven the general relice. The requisitions of the system is curried on by means of an automatic device, by which, when the lumps on the system are below their proper canalle-power, a given lump is switched into circuit, and when the catalle-power is excessive, the fact is discissful by the delayley of a red lump. The lumps are perfectly stearly, included by the delayley of a red lump. The lumps are perfectly stearly, of incandecent lumps in Regular power countle, power than the majority of incandecent lumps in Regular to the Section of the control of the system is now beyond precision.

Not less successful is the Elison Todated Company, an organization for the supply of light to milk and factories, etc., by means of plant on the premise. The company declared an annual distinct of the rate of to percent, during the month of Norember, and in so doing enjoyed the oblination of being this first electric light company to top a dividend on the results of electric lighting pure and simple, exhaling profits on manufacture or sallse of companions.

The Missi samp Company, when future is a Novemi, in Nov. Just Popular Popular Nov. Just Popular Nov. Just Popular November and Missister with the inventible new in the land of Justice processes. The Missister which is considerable more than mortized many of which are assumated performed by the agency of whiteless, "Mr. Historic mide is stamped on many of these processes," the November of the Stamped on many of these processes. Some more many of these processes, the November of the November of the Stamped on many of these processes. The Missister is the Missister in the mortraking, the resources of the future par immunificial considerable control and the Missister in the mortraking the resources of the future particular of the Missister decisions. At the Excel Natholis Works, Missister (Applied forombookaled sections).

street, New York, the dynamos, large and small, are manufactured. * * * * The factory of Bergmann and Co. is exclusively decoded to the manufacture of switches, fittings, sockets, regulators, and other details of the conplete Edison electric light system. Here also the application of electricity as a motive power and lighting agent was manifested in an impressive manner. Mr. Edward H. Johnson, whose name is well known in London, together with Mr. Edison, is continually at work improving the minutire of the system. I was shown a simple screw, the side survivor of 42 separate and disrarded models, which had failed to satisfy Mr. Edison's standard of efficiency. Details of the system are separately and constantly subjected to the fierce light of criticism, and community being brought up to the requirements of the inventor. As an example of American manufacture and administrative power, the following is an instance:-An order to light the Boston Bijon Theatre with 650 lights was completed within 11 days after receipt of the order. The theatre was wired, the boilers and engines were placed in post tion, the streets excavated, and the special regulating system necessary for subduing the lights on the various circuits on the stage or auditorium not only devised and manufactured in New York, but used in position. The writer was present at the opening of the theatre when Gilbert and Sullivan's

Islanthe was produced, and all the necessary scenic effects obtained by the use of the Edison light alone. The theatre was better lighted than the Savoy in London, and the regulation of the lamps seemed to be under more immediate control.

During past years Mr. Edison has suffered from injudicious, because premature, revolutions of his inventions, and for some time, therefore, he has remained silent whenever pressed for information as to the progress of his inventions. Some months have clapsed since the Edison system was first shown to the English public at the Crystal Palace, and, as is well known, it is in operation at various places. Since then Mr. Edison has, however, not been idle. He has made remarkable discoveries, the effect of which is greatly to increase the efficiency and reduce the cost of the light. Patents for these and other improvements have already been applied for both in England and the States, and the English companies will shortly give a public demonstantion of the new inventions. Mr. Edison's knowledge of the conditions of the electric light question in England is complete. To his mind the price of gas in England is the one factor in the problem which requires solu is this problem to which he has applied himself with so much success."

ISOLATED PLANT AT BERGMANN & COMPANY'S, The factory of Messrs. Bergmann & Co., manufacturers of appliances for the Edison electric light system, corner 17th street and Avenue B, New York City, is lighted with an isolated plant consisting of one K and one Z dynamo. The factory is equipped for 600 lights, but 300 is the maximum in use at any one time. No gas is used. The dynames are driven from pulleys on the main shafting of the factory, being thrown in or out of gear by friction clutches attached to the main pulley shafting.

BERLIN. ACADEMY OF FINE ARTS LIGHTED. Mr. Emil Rathenau, now the director of the German Edison Company, has just completed an installation of 153 A lamps, 122 B lamps and ten 32 candle lamps, in the Academy of Fine Arts, Berlin. 'Three salons in this building are now being fitted up for a loan exhibition of paintings and objects d'art, organized to celebrate the silver wedding of the Crown Prince and Princess of Germany. All that is most choice in the art treasures of the palaces and chateaux of Ger-

many is now being brought together in the Academy of Fine Arts as a testimonial offered in eelebration of this event, the Crown Prince and Princess having expressed their preference for this form of celebrution.

The exhibition was opened by the royal couple in presence of the most distinguished people of Germany on the 24th January, and will remain open two months. A special steam heating apparatus has been put up for the salous occupied by the exhibition, and the engine which furnishes light in the evening will furnish steam for this

The Edison installation consists of (1) two grand electroliers a the entrance on the street, each mounted with five 32 candle lamps; (2) a gigantic model in carved and decorated wood of the Crown of the Crown Prince, in which are placed to Blanus, placed inst inside the entrance from the street; (3) on the staircase and in the vestibule are four three-lamp brackets and a chandelier with 12 A lamos; (4) in the first salar are four "sun-hurners" in bronze and crystal, each with 15 A lamps; (c) in the second valor are 4 bronze chandeliers, two of which are each mounted with 18 A lamos, and two with 36 B lamps each; (6) a long gallery has five chandeliers, each with 5 A lamps: and (7) a small aslow furnished in style of Preserick the Great has one crystal chandelier with 8 A lanus.

This installation is made with one Edison K dynamo, run by a Ruston and Proctor engine, and the illumination is paid for at the usual price, though competitors would gladly have paid for the privilege of furnishing light for nothing.

TAMMERFORS, FINLAND. PLANT INCREASED. The plant mentioned in the second and sixth Bulletins was for the large cotton mills of Messrs. Finlayson & Co., at Tammerfors. This plant originally consisted of five Z dynamos with 300 A lamps, but has now

been increased to two K, two Z and one E dynamos and 650 A lamps. The plant is working successfully, the dynamos being run by water nower.

MANUTESPER: AROSH MILL PLANT AGAIN. This blunt methods in the bat balletin, is giving entire stitution, and wear authorized by Mr. Whitman, Superimenter of the Mill, to state that our light, although the last only 200 haps in circuit, is swing him on an average \$500 a week on his gas ball for creaming the method of the met

REPAIN. LIGHTING OF PAIR WILLELING STRASSE, This incultation is for the lighting of the street known as the Wilbelms Strasse—one of the fines in Belin, and on which resimated the Ministry of Foreign Affairs, the Phaces of Finece Biesnark and of Phace George of Fransis, the Valpade Emlease, the Banking House of Landau, the National Bank and other similar eathfects. The light was started December 11s, and has given got a staffiction as will be seen by the following extract from the Berlin correspondence of the Pairs Rigare, published under date of December 13:

"Now yo candolates, each one of a lawy, differe over the appellar of the wheel side-waits for the Wilbelms Stream, and on the fraction of these great looses; the agreeoide and startly light of the Elicen ham, which gives an admitcial fillingation without thicking the eyes. The installation is also made in a law of the startly and the stream of the startly and the stream of the startly consider, without dutalet, the law of the startly and the startly and the year by the Chancelon, when he found instead under the order to which it is should, there are the startly and they decided to enable the startly and they decided to enable the potabolity to make the Elizanch more firstly, and that are table frequencies."

THE DEATH-GURRENT AND STORAGE BATTERIES. The following letter, which explains itself, appeared in the daily press in

this city, December 27th. It is reprinted here as a matter of general interest.

"Sin :—Mr. Hayes, representing the Brosh-Soun Company, printed a card in specially is papers personneling as "incorrect" certain statements of mine published Stateday morning tooching the death-currost and storage latteries of the Sowan-Brosh Company. Public interest in the subject compels me to correct Mr. Hose and set the surfect straight.

The Book are light correct is well brown to be deadly. It has killed people, and will all light converse those the entire. The wise are arong on picks and are now used for are light. Mr. Book has a storage leating such as the storage leating and the storage leating storage and the large storage and the storage leating leating leatin

My Saturday's statement worthat the Broak Stean Conjuny's proposed to introduce these high-personne current into Bousse is five distorage better five better that statement to be from, and more repeat if. Mr. Hayes might have seen by a more excended reading for seasoned that it is seen self to five own distorated by the property of the first property

The folions current is, thoughout his verifies yets, of this precourse leads and our two residents the intensity of the Heat current, and it advantages such as thousands of persons know from leaving freely has like the wires. The life was yet now in fighting is waster for intensity obscured to model: Himmittee, and the less system of highlight is waster for intensity obscured to model the life of the leaving the out-the leaving when the charges a constitute can would be kept away from human contact. His it is not proposed to may full indiagnous current to the new values of so ellipse (lowestic Himmittee).

The Elikon Conspany, as proprietors of an absolutive date system of dismonstration, book with cape whiching so will be produced by the profile absolute parties of a produced by the profile absolute parties of a produced by the profile absolute parties of a profile parties of a profile absolute parties of a profile absolute parties and the absolute parties are a profile absolute parties and the absolute parties are a profile absolute parties and a profile absolute parties are a profile absolute parties after a profile absolute parties and a profile absolute parties after a profile absolute parties and a profile and a profile

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does not cure it. The bad fact remains that the wires leading from the street to the storage battery, wherever located in a house, are death-giving, and these wires, whether passing up or down the outside of the house wall, or up or down the inside, must, before reaching the storage battery, he more or los Table to chances of contact. This danger will be more readily seen if I explain what the storage battery is and where it will be placed.

What then is the Brash storage battery and where will the householder locate it? That battery, as shown here last week, is described as a coffin-shaped hos eight feet long, sixteen inches wide and sixteen Inches high. This hos is filled with lead plates, is of great weight, and must be placed where it can be got at for the purpose of occasional treatment. Every house would need to have its own separate battery, and many customers will require a munber of these loves, varying with the amount of light required. In some cases they may be out in the cellar, in others in a closet with a strong theor, but place them where you will, the wires leading to them earry the death-current. Although every effort be made to keep the covering of these wires unbroken and their location intact, still, immunerable occasions will happen, such as house repairs, Ac., by which they will be exposed to contact. Whoever touches those wires—it may be a curious child, a stupid servant, a fireman, a workman engaged in plannling, carpentering or carrying coal-whoever touches thrus so as to receive the current will be killed. The public, as I have stated, will my discriminate. If death happens from such contact with electric wires, a storm of indiscriminating public indignation will attack all methods of domestic lighting by electricity. It is for this reason that the Edison Company views with deep alarm the possible advent of the Brush-Swan storage batteries, fed in the manner described by Mr. Brush in recent newspaper articles.

President Edison Electric Light Company.

65 Fifth Avenue, New York City, December 25th."

CONTRACTS CLOSED BY THE WESTERN EDISON LIGHT COMPANY. Since the issue of the 15th Bulletin the following contracts for the installation of Edison plants have been closed by the Western Edison Light Company:

- (1). A plant of two K and one L dynamos and 637 A lamps to light Haverly's Theatre, Chicago,
- (2). A plant consisting of nne L dynamo and 176 A lamps for the Daily News Company, Chicago.

(3). For the Agricultural implement manufactory of Messrs. R. H. & C. M. Avery, Peoria, Ills., a plant of one L dynamo and t42 A lambs.

- (4). A plant of one L dynamo and 178 A lamps for the lard works of Messrs, N. K. Fairbanks & Co., at St. Louis, Mo.
- (5). One L dynamo and 175 A lamps for the dry goods store of Messrs, Melcalf Bros. & Co., Detroit. Mich.

A LARGE SUGAR REFINERY LIGHTED. An order has been received for a plant consisting of three K and one L dynamos and 900 A lamps, to be installed in the sugar refinery of Messis. Havemeyer and Elder, at Williamsburgh, N. Y.

ANOTHER STEAMSHIP PLANT. We have received an order from the Oceanic Steamship Company, San Francisco, for a plant of one I, dynamo and 150 A lamps, to be installed on one of their steamships now in progress of construction. This steamship, which has not yet been named, is to run between San Francisco and the Sandwich Islamls.

SIDNEY, NEW SOUTH WALES. A NEWSPAPER PLANT, The following in an extract from the Eletrician, London, December 23nl:

"The Sidney Morning Herald office has been illuminated by the Edison Electric Light. In amounting this fact the Herald says: "The wires at present are distributed only over the composing frames and in the engine room, but errough is seen to fill every one with admiring sarprise, shallows being compresses by their absence. The difference in the temperature of the composing room, ordinarily very warm, during the time these lamps are burning, is very marked. The order for the fettings was carried out by Mr. H. H. Kingsbury, representing Mr. Edison's Interests in New South Wales. The compositor it may be mentioned, express their admiration of the new light, considering a superior to that to which they have been accustomed.

TESTIMONIAL FROM A NEWSPAPER PLANT. The Standard, Jackson, Ohio, January 18th, prints the following replareceived by a resident of Jackson, from the Business Manager of the Ohio State Journal, Columbus, which is at present lighted by an isolated Edison plant. The question of electric lighting is being agitated in Jackson, and the letter was written to the Journal for the purpose of ascertaining how our light was liked. The letter is as follows:

" COLEMBES, O., Dec. 9, 1882. DEAR SIR: Respecting the Edison Electric Light, I beg to say that we have been using it since February of this year, and it has given the very best sort of satisfaction. It is cheap, easily managed, and perfectly safe. We have thus far used it only on our first floor, but are now arranging with the Edison Co. to extend over our entire presuses, and shall then use it wholly in place of gas. We have lead no more difficulty in running it than with any other of our machines. We employ no electrician, and our engineer attends to the dynamo for \$3.00 per week over his costomary salary. Our experiments relative to the comparative cost of the light demonstrates that it is about equal to gas at \$1.00 per thousand. Our employee prefer the light much above gas. In short, we regard it as imprestionably the rouning light for all purposes. I shall be pleased to furnish you my additional information.

Yours truly, J. C. Banas, B. Meg.

DAVIS MACKLEY, ESS, JACKSON, O."

ERIE ELEVATOR PLANT, JERSEY CITY. This plant, mentioned in the Fourteenth Bulletin, is now in operation. The distribution of the lamps is as follows:

Track floor			50 A	t 6	caudle	hune	
Ontside dock lights		-	18				
Offices			11 "				
Front passage -			3 "				
Two fire rooms			6				
Dynanio room -			,	٠.			
Engine room -			g				
Air line outside	_						

Chister fo	r lig	ht	n;	y.	110	1	٠		7	A	32	candle	lanns.
Elevator s	haft									В	-8		"
Belt shaft									4				**
2d or Bin	floo	r						-	41	A	16		
3d or Scal	le fl	oor							24	••		**	**
									2	Α	32	**	**
								am	lı	В	8	- 0	**
4th or Gai	rner	fle	ю			-	-		15	Α	16		••
								and	7	В	8		**
5th or Ma	chis	ery	1	(in	r				22		8	**	**
Conveyor	floo	r							10	Λ	16	**	
ist floor									6	••	••		
and floor						-			2				
3d floor									4		••		
4th floor						-		-	4		••		
5th floor									•2	••			

The wires from the house are connected with the dynamo be about 40 feet of No. 4 Electric Tubes, at the end of which is placed a safety cut-out protecting the whole system in the house. The 18 lights on the dock are on the first floor system, each fixture, passed through the brick wall, being fastened on the inside, and each wire being insulated with rubber tubing the whole length of the fixture,

EDISON LIGHT FIXTURES. BERGMANN'S FACTORY ENLARGED. The large factory originally occupied by the United States Electric Lighting Company for the manufacture of Maxim lamps and dynamos, and purchased from them by Messrs, Berg, mann & Co., for a factory for manufacturing house fixtures and appliances for the Edison light, as mentioned in the Thirteenth Bulletin, is now under full operation. About 300 men are at present entployed. They are all engaged exclusively in manufacturing those details permining to the Edison light system which are outside departmen, the lamp and the staret conductors, namely, such articles as electrollers, henckets, motors, junction boxes, galvanours, rest, various kinds of teving apparatus, and a variety of other special Edison devices. Measure Bergmann & Co. originally arranged to munifacture these articles only for the United States, but from the tot of their being the first in the field, and owing to the rapid apread of the Edison system all ever the world, they are now shipping goods of all parts of furney. They have recently improved from England, and now carry in stock, many unique and costly designs of electrolers and brockets. These are similar to those shown at the Crystal Palace exhibition in connection with the Edison achilibit, by the London makers, Measure Versers, Verify & Co., of Convent Garden.

The building purchased by Bergmann & Co., from the United State building purchased by Bergmann & Co., from the United State building Company, lawing proved inadequate to the rapid growth of their Instinest, they have recently recreted and put into operation a new brick building. 55 x too feet, contigenous : their factory, to be occupied as a bross-foundry annex as their main establishment. By means of this factory they are enabled not only to obtain their eastings with promptness but also to secure a better and more suitable article for the requirements of the business.

In their show rooms they are gradually accumulating, in addition to their standard, goods, a great variety of futures of rae and rich designs. The electric circuits in the building are so arranged that sample futures can be liminated instantly, so so to show the effect produced when lighted. Mesur. Bergmann & Co. will soon Issue a new edition of their catalogue, which will contain case, with prices of all the latest designs and apparatus now manufactured by them, including soons of these imported designs.

MELBOURNE, AUSTRALIA. OAFE LIGHTED. The following is an extract from a recent issue of the Melbourne Herald,

and relates to an exhibition of the Edison system in the dining-room of the Cafe Gunsler, Melbourne:

"The tables, which were building descented, held I support in each of which an Eldon bearer was placed, and the Good-bridge placed in each of their placed was singularly benefits." For each of light, each of any many against the materia at the sides of the rows, and the relations of flowers, each building to burners, crossed the town at the role of the tables. As there of § human summoded each of the colonized chandless. Thus, there were 50 fights in all, the result being a bairs of light which, had it been created by the combination days would have been a building bullearties,"

EDISON PLANTS IN EUROPE. The last two Bulletins contained an itemized list of all the isolated plants in the United States. They numbered up to the date of the last Bulletin, December 20th, 153 plants, aggregating 29, 192 lamps. Since the last Bulletin we have received from Paris a list of all the plants installed and in progress of installation in Europe. It is as follows:

FRANCE.

NAME.	ADDRESS	BUSINESS.	Louis
Compagnie de l'Ouest		R R Nanon	
Magazina du Bon Marché		Stores	
Magazine du Louvre	*	Seeget	60
Banque de France		Red	
11. Pochet		Glass Werks	
Loid File		Frathers	Bo
A. Labore		Pruner	
Hackette & Cle		PARiders	60
Hetel Continentale		Hotel	
Ph. Basin	Coude Meireatt	Thread Works	73
Ch. Coffinel	Au Chean	Wearing	120
Pondrerie de St. Chamas	St. Chamas	Pender Mill	60
Experition de Bordeaux	Bordonna	Expedition	190
Dundon & Kills	Presignan	Paper Mill	fe
P. Schnidt & Filte	St. Dit	Resery	149
Fenal Freires	Pescene	Pettery	8-
l. Lac.	Namey	Tannery	(**
R. Lacifel & Cle	(Blainville Meurilie)	Threat Works	75
M. Clerget	Vesest	Careed Provisions	. 60
Lepage & Cir	Louviers	Thread Works	59

(171

NAME	ADDRESS.	BUSINESS.	LAHER
Hannar Ferres. L. Lefebwe Mone & Mailhaseux Mone & Mailhaseux A. Larocho, Jeubert & Motteau. P. Dandiodle Fin & Chardina. D. Chavean L. Sabertle S. Sirves. S. Greband. Helle Jardiniece	Roslaix	Machine Shopa Merchants. Café. Merchant Paper Factory.	\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$

ITALY.

	BUSINESS.	LANDS
	Cotten Mill	190
Bergamo	: :	130 (0
Vicevano	Cotton Mill	104
Furin		130
	Softiane Blasto Vapria Bergamo Vya	Ysa. Sill. Sill. Sill. Sill. Cotton Sill.

GERMANY

W7:	5222.2.2.		7
NAME	ADDRESS.	DUSINESS.	NUMBER
W. Buxensteis	Berlin	Printer	LAHPL
Bohnisches Brauhaus		Browery	120
Union Club		Club	50
Schüfer & Hauschner		Club	
Fischer & Seige			
Norddontarlas Rafficacio	Rostock	Saw Mill	31
			13
Societé Strontianit	Ahlen	Mine	

NAME.	ADDRESS	HUSINESS.
Gasette de Chégae		Newspaper
George Andres		
Durkopp & Cir		Machine Shop
W. Schroeder & Cie		Weaving
Major Logwi Fréres		
William Vogel	. Musick	Restrictant
Ch. de fer Abace Lerraine		R. R. Station
Emil Ascherberg	. Dresden	Page Factory
Hef Thelitre	. Dresden	Theatre
Keniel Resident Thildren	Munich	Theatre
Exposition Munich	. Nunich	Esperition
Von der Heydt	Elberfeld	
Chantier Imperial	A Dentrig	Dock Yanl
Course Federa	Hemburg	
ties for Floreric Light	Cologne	ć
Bouchte & Burbakiel	. Zittaw	
M. Mochring	Francfort	
Rue Wilhelm		

HOLLAND

		2	Visua
NAME.	ADDRESS	BUSINESS	Lun
A. W. Krawapolsky		Station	500

AUSTRIA.

NAME	ADDRESS.	HUSINESS	
Union Ray Gesellschaft	Viene	Restaurant	
Théltre de Brûnn	Belon	Theatee	ı
Cte. St. Genois			
F. de Puskas	Pest	1 Agency	۰

RUSSIA

NAME	ADDRESS.	HUSINESS.	Nosasa
Findayson & Cir	Tammerfore	Charact March	640
Cleale fer Kunrak Kieff	Konove	to be come	
			60
			"
Denbitzky & Cir	Charles to	Man	17
M. Tanaca	Y	tog Factory	60
M. Nubel	Harrier	Sugar Refinery	140
M. Lemovsky	Tirretaggore	Forge	100
Station Centrale	Concline Sergered	Theater	fe-
Mr. Johnson	Vsaskyts	Naw Mill	1,0

BELGIUM.

NAME	ADDRESS	DUSTNESS	Nемата от
Bellard & Best	Annes		LAMPA
			120
M. Rey aloe			60
E. L. Godin & Fils N. Forta & Cie			
			500
Musee du Nord	*	Museum	tun

SUMMARY.

1,068

COUNTRY.	INSTALLATIONS.	LAMPS.
rance	*** ************	
taly	, , , ,	a,f8o
Jermany		3-777
logani	,	3,662
Austria		1,648
Rumia	,	1-774
Belgian	14	1,272
	12	11258
Total	tol 1	19.176

MR. EDISON ON STORAGE BATTERIES. The Boston Herald, January 28th, contained a lengthy interview with Mr. Edison on electric lighting generally. He spoke of storage batteries as follows:

" 'Mr. Edison,' said the writer, 'what is your opinion of the utility and value of storage batteries?"

'The storage battery is, in my opinion, a catch-penny, a sensation, a mechanism for swindling by stocking companies."

"Do you wish me to repeat in print that expression?"

*Certainly I do, and it is the truth. The storage battery is one of those peculiar things which appeal to the imagination, and no more perfect thing could be desired by stock swimthers than that very self-rame thing. In 1879 I took up that question, and devised a system of placing storage batteries in houses connected to mains and charging them in the day time, to be discharged in the evening and night to run incamlescent lamps. I had the thing patented in 1879 (I forget the date of the patent), but there is nothing in it. I rong all the changes on it. My plates were prepared like Plante's. The method of preparing them for charging is more tedious, but it is better than that of Faure, after preparation. You know the first storage buttery was sent from France by Faure to Sir William Thompson, who was at first astounded by it. He was asked to indorse it, consented and took a retainer; but on investigation he became convinced that there was nothing in it, and returned the retainer to the French company. The fact is, the more he in vestigated the more he found out the fallacy of the whole husines

*On account of what Labouchère calls a swindle, this secondary battery has been used by the arc companies in England. One company abuse, on the strength of an accumulator and an incambescent lamp, copied from mine by one George Lane-Fox, floated subsidiary companies, whose aggregate 19 year (corrge rame-row, Breatest satisfactory companies, whose aggregate capital was over \$50,000,000, and immense same were public bytese companies to the parent company for rights. Within the last few mouths the hubble has burst, the shares upon a bird 525 have been public are offered at \$11, and the swindling companies have been such a readered at \$15. tions in their prospectuses as to the value of the accumulator and the right in the incandescent lamp of Mr. Fos, it appearing, from the proceedings before Mr. Justice Chitty, that another company had the right to the lamp, and this company had acknowledged that it was a piracy of the Edison lamp, and were paying royalty to the Edison company for the right to use. The action before Justice Chitty was by a stockholter in a subsidiary company to cause the return of his subscription on the above account. The judgment was in his favor.'

'Hot cannot electricity be stored?'

'Yes. Scientifically the thing is all right, but commercially as absolute a failure as one can imagine. Von can store it and hold it; but it is gradual-ly lost, and will all go in time. Its efficiency, after a certain number of The fact are, that there are two or three companies that have been explainting sub-liding are tiple companies throughout this country for some time grad. In this arrangement the pracent company made enumely a pilling anotheracy exists, in the working companies. Now these parent companies, finding the call for marchinery shading, have once in with their controllar parents. They now market this statement, which is the devoes thing I ever heard of "I litera; gentlemen, you have a large investment in the controllar parents." For you were after this cancer to the controllar parents of the controllar parents and the controllar parents are an uniform your machinery. Vocaton work shy and night, and car do more work. You can milke you machinery the fact in the controllar parents after in the chip time, and the effectively then such the time to the day line for interactions lighting, and in the right have your load of the chip time of the controllar parents are the controllar parents and the controllar parents are the controllar parents. The controllar parents are the parents are the controllar parents are the controllar parents are the parents are the parents and the parents are the paren

I will oil you where the Ollacy in this arrangement Hes. It consists the fact that the soot of latteries to be entite in care a decrify that could be produced in the day time would be twice as much as that of the statistic and approach is to but, if the company has already 5 stococcious toward, and agree to either their machinery in the sky time by the addition of sharing betteries, they will find that tourrange that electrical will reduce the state of the

unity Med. (Bey have purchased the storage batteries, of courie, at a cost of \$200,000. On this interstitute, at the ord of the first year, they have a de-preciation of go per cent. To acce themselves they will have to seen interference their procedure. They must also were amought to meet the exits depreciation on their plant running through the day, and will have to spead shutter amount in cent or bedome the same of the order that the order to the or

'What is the maximum of a storage lattery?'

It is about 50 per cent. You get the maximum of current when you utilite the full capacity of the hattery, the same as in a steam engine, where, if steam is admitted for the full stroke, 50 per cent, of the steam or power is wasted, but you obtain the maximum power from the cugine; but this is also the minimum of economy. Hence, to get the proper economy, engine londlers only take one-third to one-fourth of the maximum power from their explice, battles one-third to one-fourth of the maximum power from their explice, but this able to the lawsament, which is compensated for by the saving in economy, which more then saves interest on internact insostrores.

When they say that 90 per cent, is obtained from the battery they sell you what is scientifically true. They say they get to lights of 16 candles each per horse power of current from a battery. Now that is true, and it is not true. It you get a horse power of current from a futtery it will give you to lights of 16 candles; but to get that you have to not all looses through the battery, through the wires, through the dynamo, and all that. They start off with a horse power indicated in the envire. A certain amount of this is taken to snove the engine and dynamo, and a certain amount is lost in the dynamo to convert power into electricity, because no machine is perfect; a certain amount must be lost on the wire connecting the station with the secondary battery; nother amount is lost in charging the lattery, due to its resistance and imper ection as a mechanism; another amount is lost during the interim between charging and see; another portion will be lost in discharging the battery through the lamps, and still another amount will be lost in the wire connecting the battery to the lamp. So that your horse power will dwindle down until it will give you only about three lamps; whereas, if you worked direct, you

would probably get six lamps."

'You are hand on the battery folks."

The record Land down on these people is because I have a legislated being, and there is a loo set public continuous in through left-ori specialism, and there is a loo set public for among. Nov. I short want the possible he windred, for it want our consquary loom has money. or of circum legislates in a legislatest way, by giving value for what is received, and, if it cits rights in the persistent their less the presents officialism in a legislatest way, by giving value for what is received, and, if it cits rights in feet proteines of their less the presents officialism in a many present the present of the present of their in a many present in the present of t

The same ssistile which is it designed to perpetrate upon the people of this country has already been carried out in Englant, and as a result people there have local flooristicnes in electric lighting. The same people are here. They have what they call the Swan lamp, a pulpable infringement on mine. We have entered usin against them in Englant, and will be other here. But these people know well that it will take some dime to get a will vicibel, and by that time they will have permitted the public to invest heavily.

'Then you consider storage batteries wholly impracticable? Is there so hope for their doing good, legitlmate work?'

hope for their doing good, legitluste work?

'None whatever. Except in a very limited number of cases, storage of gas could be made analogous to storage of electricity. One of the principal outlays of a gas company is for pipes. The average diameter of their mains is

fix or six factors. Inst, under pressure greater than they move force the gas through later it units, and the pipe would some ounselve the second principle of hardag, a small gasometer in every house. The difference saved to the community by this arrangement would be along six for pipes from bose in house, 35 to 35 for six parts. Hus the gasometer would not an great deal move in seed to be a six of the six of the

burnt. Now, these little mechanisms are uncertain. The general intelligence of the public, when applied to mechanism, is also uncertain; and this has probably prevented gas engineers from introducing a system of local storage. The electric are company, which is seeking to introluce a system of storage, follow out the above idea exactly. Instead of using large conductors and low pressure electricity, as I do, they propose to save or the investment by using small conductors and high pressure electricity; and, to make this kind of electricity available, they reduce its pressure by means of a storage battery in the same way as high pressure gas in a small main could be stored in a gasometer and its pressure reduced to make it available. In the first place, the high pressure current is very dangerous to life. The depreciation on storage batteries alone, in a system of general distribution, would pay the interest on the extra copper sufficient to dispense with their use; and second, if these small wires carrying high pressure currents were to be placed malerground, as all systems must be to be financially permanent in large cities, the extra cost of the insulation necessary to prevent the leakage of the currents of so powerful a pressure would more than pay for the extra copper used in a system which entry low pressure currents, and do not require so expensive nor so ereat an amount of insulation. The cost of our mains is about \$15.00 from house to house. These mains are two feet mulerground, where the intellectual portion of the public cannot reach it to improve it, while, with storage latteries, from \$75 to \$200 worth of batteries would be placed in each house to save about \$9,00 in copper and interpose an uncertain device in which 30 per cent, of the article to be sold is lost," Mr. Edison here paused a moment, beld slown his local, and, quickly raising it again, said, in his quaint way: 'Just a soon as a man gets working un the secondary battery

It brings out his latent capacity for lying."

* But suppose power was cheap, such as a water power, would it not pay to store electricity even at a great sacrifice of energy?"

In utilizing unter power, even where the cost of water is, say nearly cothing, there is still the cost of plant for tording the exmistered, and interest and dependation added. Where is the use of this outlay when, in nearly every case, by countering the dispansa direct with the trailes post can get the same result for more thempty? Het you will remember that water power is not so change after all. It is only recasionally you can me across a water 3

power that has a supples in every month in the year leyoud the suants of these with the Line Section queue will tell by not had happed in the substance of from latteries than from the sursex of power slinct. This is now. They are the properties of the part of the substance of the power should be part from a torse to be read from low transport of the part of the p

There is a natural low working against the stronge interry, and that it after plicitled that decompares were. It is useful that when Sie William Thompson had his attention called to this first be those on the Si William Thompson had his attention called to this first be those only the sponge. All the stronger to put them back again into a meetille fines, when it is again for it. Mr. fronk on we then been a smellife fines, when it is again for it. Mr. fronk on we were a stronger to the a Your bettery, this and single. They say they cannot familis these lunteries for we month. There are shops in their eight and man turn out of cond their cult within these works. The parent Brooks Company is a reprectable and necessarile or generation, but the Planch-Seam Moore Company is can year, and the condition of addition that the Planch-Seam Moore Company is an expectable on the canonical first of addition.

Mr. Ellion here took up a payer and real some currents from an article about the literal-lewan Bleeter's Light Company. Commenting on h. he wild, among other literal lewan Bleeter's Light Company. Commenting on h. he wild, among other things: 11 believe there is a sciety for the prevention of credity to animals, and another for the prevention of credity to animals, and another for the prevention of credity to tableton. Sow they ought to get up a society to povered people making loads of themselves. The receiving of moory for such articles as those [referring to the one be warreading] unglist to be made an officiar at law, for, if it is not a form of obtaining.

sweapy by the preference, I do not know what is."

"Now we will remain to the strengt, beingy over more and emparison."

Now we will remain to the strengt, beingy over more and emparison.

"Now the strength of the strength of the conversable of the Arthur of Morten, Yang, some first the conflowable emploising, I was found that the Arthur of Morten, Yang, some first the strength of the conflowable employed the strength of the s

yo	maps for an nours costs 59,975.		
	Depreciation 25 per cent	13	75
	Interest, 8 per cent	S	α

. ...

As the statement is to lamps, per horse power for the storage cells, they decelop 32 horse power; he as 450 per each of the energy developed horse negline is allthan to recent of the energy developed horse negline is allthan to returned by lastery, 37-5 losse ground of the product the 8 hours of changing. A soul of 300 should release the control of the engine at 4 pointed of one propower—a total of 1,200 pounds per day, or of 180 homes year comming good days, at \$1,500 per ten.

Investment of \$3,000 for dynamo with which to charge the cells, and 10 per cent annual interest and depreciation.

Total annual expense without cost of dynamo and batteries. \$4,401 75

There, you have the annual cost by the battery for running 250 lefts wit boust per day for 300 days. You will observe that only interest and depreciation of plant and actual cost of fiel are charged. Let us more compare the same service by the direct system, throwing in the cost of the dynamo, and see what result we shall obtain.

Cost of tjyramao. \$1,000 february 25,000 february and depreciation to per cent. \$100 february 25,000 february

In words still be int. ***

*** and still be int. **

*** still be stil

Mr. Edison then went into calculations for smaller plants, but, as his figures would only confirm what he has just given, the writer thinks he need not repeat them."

DANGERS FROM GAS. On August 12th, last, Giovanni Romanelli and Angelo Lamfine were found in their bedroom at No. 71 James Street, New York City, unconscious, having been overcome by escaping gas, with which the room was filled * * *. About August 10th, last, a serious explosion was caused by seeking for an escape of gas with a light. It occurred at 194 High Street, Borough, London, England, on the premises of T. Leftwich. Two women were severely burned upon the faces. The house was damaged by fire, explosion and breakage * * *. On September 18th a Preakness farmer, named Andrew 11. Van Riper, was nearly suffocated to death by blowing out the gas on going to bed in a hotel at Paterson, N. L. * * *. A gas machine on the property of Charles Richardson, at Chelten Hills, Pa., blew up October 3d, wrecking the gas-house, and dangerously burning James Mc Ainch, the workman * * *. William Donovan was badly burned about the head by the explosion of gas, October 20th, in a man-hole of the New York Steam Heating Company's pipe system at Cedar and William Streets * * *. On October 21st, Mr. Joseph A. Stafford, of Queen Anne's County, was found in bed in an inconscious condition in his room at Deselr's Hotel, South Broadway, Baltimore, from the effects of inhaling gas, which, it is supposed, he blew out instead of turning off * * *. A gas pipe caught fire in the oyster and packing house of Moore & Brady, foot of Montgomery Street, South Baltimore, on October 25th. The flames were extinguished by employees, who shut the gas off at the meter * * *. On October 26th, while workmen were engaged in searching for a leak in the gas pipes in an upstairs' room in the new building of the First National Bank, Hagerstown, Md., an explosion took place, setting fire to the building and badly shattering the walls of several of the rooms * * * . A fire broke out October 28th, in the fruit store of John Fisher, in the basement of No. 791 Eighth Avenue, New York. While the firemen were trying to discover the origin of the

nko)

flames, there was a sudden escape of gas from the service pipe in the basement, and several of the men were nearly suffocated * * *. leremiah Shaughnessy, of 217 Mott Street, and Michael Farrell, of 1334 Third Avenue, were burned in the face and hands. November 16th, by the explosion of gas in a sewer main, which they were repairing at the corner of Park Place and Greenwich Street * * *. On November 17th, William Toland was stopping at the Washburn House. Batavia, N. Y. A chambermaid passing through the hallway noticed a strong smell of gas coming from Toland's room. He was aroused and seemed to be very little effected. Later in the day, however, the poison he had inhaled made him quite ill, and the services of a physician were called into requisition * * *, A stranger, who gave his name as R. Petri, took a room at the Summit Hotel. No. 65 Bowery, N, Y., November 19th, and late in the evening he was found unconscious in his room, having turned on the gas and allowed it to escape full pressure until it filled the room * * *. John Me Grogan, foreman, in the employ of the American Steam Heating Co., was burned on the face and hands, November 19th, by an explosion of gas in the man-hole at Nassau and John Streets. He had a torch in his hand, and gas was leaking from the gas main. The hair and beard of Michael Gilroy, who was with him, were singed * * *. On November 26, an explosion, caused by escaping gas, occurred at the cotton spinning establishment of Messrs, Ormrod & Hardeastle, at Bolton, England. Some damage was done by fire and explosion, and four workmen were slightly burned about their faces * * *. On December 19th, a fire occurred in the store of I. P. Lovell & Sons, of Boston. It was caused by an explosion of gas in the basement. Two persons were badly injured. and the loss was \$135,000 * * *. On December 5th, an explosion, caused by escaping gas in the basement of the four-story brick building on the sonthwest corner of Grand and Christic Streets, N. Y. City. resulted in the loss by fire and water of \$25,000 * * *. On De-

cember 19th, William Latis and his wife were found dead in bed, in Court Street, Rochester, N. Y., having been suffocated by escaping gas * * *. James Walker, of Chicago, Ills., was found in his room in the Occidental Hotel, N. Y., in an unconscious condition, the room being filled with escaping gas * * *. On December 25th, a fire, caused by a gas jet in the show window of Jacob Beestoffs, Brooklyn, N. Y., resulted in a loss of \$3,000 * * *. December 26th, some goods in the window of Z. Epstein, 963 Third Avenue, N. Y., caught fire from the gas, and set fire to the store. The loss amounted to \$2,800 * * *. A slight fire, caused by looking for a leak in the gas pipe with a lighted candle, occurred at the store of Peter Hull, 552 Myrtle Avenue, Brooklyn, N. Y., December 26th * * *. Gas set fire to some Christmas greens in the house of Leua Salter, 175 Christie Street, N. Y., causing an alarm of fire. No damage was done, however * * *. On December 28th, a fire, resulting in a loss of \$4,000, was caused in the building of Max Miller, 429 Hudson Avenue, Brooklyn, by workmen carelessly handling varnish near a gas-light * * *. A slight fire occurred January 2d, at No. 167 West 34th Street, New York City, by the window curtains catching fire from a gas jet * * *. On January 3d, a fire occurred in the printing office of E. Bridgeman, 88 Warren Street, New York City, doing damage to the extent of \$4,000. The cause was the catching fire of a shelf from a gas jet * * *. A fire, doing damage to the extent of \$100 in the residence of Col. Chas. 11. Taylor, 108 Charles Street, Boston, Mass., was the result of a window curtain catching fire from a gas jet, January 3d. * * *. A window curtain caught fire from gas in the top floor of No. 113 East 25th Street, New York City, January 10th, and caused a fire resulting in a loss of \$500 * * *. A fire was caused in the elothing establishment of Whittlesey & Co., Hartford, Conn., January 3d, by an explosion of gas. Damage was done by the fire to the extent of \$1,000 * * *. A slight fire occurred January 15th, at 241 East 75th Street, New

No. 17.

York City, by a Christmas tree catching fire from a gas jet * * * A gas jet at No. 4 Warren Street, New York City, set fire to some wood-work, January 15th, and eaused a small fire * * *. A defect ive gas-pipe caused a fire at No. 5 Avenue A, New York City, on January 16th * * * A fire, causing a loss of \$2,500, was the result of a window curtain coming in contact with a lighted gas jet at the dwelling of Mrs. C. N. Hamphrey, Hartford, Conn. January 14th * * *. Escaping gas resulted in a slight fire in the basement of the Merchants' Insurance Company's building, Newark, N. J., January 20th * * *. A window curtain, in the house of Oscar Bennett, 253 Mulberry Street, Newark, N. J. came in contact with a lighted gas jet on January 20th. The result was a fire and loss of \$100 * * *. A fire was caused in the St. Louis Hotel, Duluth, Minn., January 15th, by an overflow of gas * * *. On January 23d, at 45 Nassan Street, Brooklyn, N. Y., a window curtain came in contact with a lighted gas jet, causing a fire and damage to the amount of \$200 * * *. A man named Fernowsky was found in bed insensible, at a hotel, No. 30 Bowery, New York City, January 26th the room being filled with gas which was escaping from a defective pipe. He was removed to a hospital, where he subsequently died * * *. The gas in the lower section of Pawtucket, R. L., went out about 12.30 A. M., December 20th, and left that part of the town in darkness. causing a great deal of inconvenience as well as danger from escaping gas.

SEVENTEENTH BULLETIN. The Edison Electric Light Company, 65 FIFTH AVENUE, NEW YORK.

April 6th, 1883.

Office I solletin, originally issued as a convenient way of answering the negative of filter agent, are now, in exposer to numerous request, writ also to all stocklosders, to give them information of the progress of the Company and of other numbers of greater or loss interest connected with electric lighting. Agent are proteclarly requested to communicate to the Preddent vibratory runctical point of general interest may be developed by their experience in installing or opernation our filebox.

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Village Lighting. Plant at Roselle, New Jersey.... Watertown, New York. A Small Central Station.... Stutteart, Germany. Deput and Post Office Lighted..... New York Commercial Advertiser to be Lighted..... Italiimore. Johns Hopkins Hospital to be Wired..... Steamship "Alemeda" to be Lighted. Waterloo Station, London. Plant Increased..... Installations made by the Western Edison Light Company..... Rays of Incandescent and Arc Lights Compared.... New York City. Dakota Apartment Building...... S Madrid, Spain. Factory Lighted..... Steamship Lighting. Safety of the Edison System Demonstrated...... New York. Mr. Yillard's Residence Lake George, New York. Hotel to be Lighted....... t1 Philadelphia, Pa. Testimonial. 12

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FIRST DISTRICT, NEW YORK GITY. This plant still runs with unavering uncess. It has now been no operation seven mon to operation seven mon to operation seven mon consensuational may true brillib, not only an our customers satisfact and grave their bills, not the channels for the light, and that fair to soon exceed our capacity to supply it. That thet enables us, the fair to soon exceed our capacity to supply it. That thet enables us unnow to pick our consoners, and we have already legister to stately rule of a taking only those who use the light for many consecutive tomes, are the exercise part of all thy or all night.

Inquiries are frequently made for a list of enstomers using our light in the First District. We are at present lighting 368 houses, wired for 8,117 lamps, and a complete list can be seen at any time at our office. The following is a partial list of some of our prominent

NAME		40100	ESS	. !		BUSIN	ESS.	Ner t.a.
Kolder, Peabody & Co	. No	nau Si	rire					
Fok & Harch		**	٠.			******		:
Continental Bank	•	••	٠.	••••				
Vernilee & Co		•	٠.					
Third National Bank	22	••	٠.		**			
Winslow, Lanier & Co	25	**	٠.					
John II. Meeker	4.	••	٠.		Fagra	mg*		
Iss. 1-ach		••	**			· · · · · · ·		
Union Building	50 W	illium.	Stree	1			*******	
Mat Jacoby	106		**	****		ing		
Alexander Agar	110		**		Station	45		•••!
A. S. Barnes & Co	***	**	**					
Samuel Rayner & Co	117	**	**		Envelo	10		
Wes. Tate & Cot		**	**		Engra	44		***
Lehn & Fink	160	**	**		Druge	******		
Morris Tasker & Co	rs Go	dd Sin	et.			Military.		
Washburn & Moon Co	16 CI	If San	×1					
Arnonia Brass & Copper Co	to *							
					Mumb	sta, Min	erisk	:
Richard Koll	164 P	eatl 8	rest		Revisi	.ratt		
D W Pass & Sans	t tt P	roes S	rest		Whole	sale táq	port	•••
Dread, Morgan & Co	21 W	ati Str				A		"
Commercial Union Assurance Co.								
U. S. Anay Office	ű .		٠.					•• :
Great Western Insurance Co								

NAME.	ADDRESS.	nusiness.	LAHPS.
	Go Wall Street		,
Knickertsscher Insurance Co	jes		6
Howard Insurance Co	66 " "		17
New York Insurance Co	72 " "		6
Chase & Higginson.,	24 Pine Street	Bankers	13
Post, Martin & Co	16 " "	*	,
Smillein, Althory & Co	56 Maiden Lase	Paints	10
Parke, Davis & Co	to " "		*3
Shannen, Miller & Cranc	ø " "	Military Goods	19
Motley & Socrling	16 John Street	Railway Supplies	15
W. C. Duvekinek	so - "		17
Edward Berrander	gs - "		33
Moore & Warren	57 " "	Printers	13
Dingfelder & Libko	ve Fulton Street	Segars	1 13
Harlon & Goodman	S	Begshes	12
D. B. Kirk & Co	6	George	1
Silleck & Co	of " "	Furnishing Goods	71
Nack Mayer	Page 41 41 4444	l	62
E. Goldbacher	· · · · · · · · · · · · · · · · · · ·	Optician	100
D. Jacobs	line	Taller	
S. Bowman			**
F. W. Device & Co	les * *	Paints	1 4
Kurffell & Ever	1027 " "	Drawing Materials	
Marshall Lefferts	so Brekman Street	Iron	
New York News Co	be " "	Newspaper, Books, etc	10
McGowan & Sipper	ha	Printers	14
New York Times	Ľ	Daily Newspaper	***
Truck	S Spruce Street	l -'	l ia
F. N. Burke & Co	19 Mart Street	Oile	1 11
Seatury & Johnson	n	Drugs	
Pancoust & Roserts	G		1 14
New Haven Steamboat Co	Fer at E. R		
D. H. Houghtsling & Co	ter Front Street	Teas	1 4
Manhattan R. R. Co	Fulton St. Station		21
E. Itlackford		Fish	

We are now engaged in equipping additional buildings, among which are the following:

NANE	ADDRESS.	BUSINESS.	LAMP
Brown Bros & Co	59 Wall St	Bankers	49
Chas. Unger & Co	54 Wall St	*	٠ ١
Western Union Telegraph Co	195 Hrundway		133
N. British & Mercanille Ins. Co			
New York Stock Exchange		·	300
Satteriee, Hostwick & Marsin	35 Cedar St	Insurance	16
Holl and Express	Park Row	Dudy Newspaper	45
Commercial Advertiser	Fulton & Nassau Sta.) ·	, 26

VILLAGE LIGHTING. PLANT AT ROSELLE, NEW JER-SEY. We have installed a Central Station plant at Roselle, N. J., being the first "Village Plant" installed. The conductors, the largest being No. 00 wire, and the smallest No. 18 wire, are suspended on poles 30 feet in height, and 130 feet apart, the positive wires, where there are more than two, being on the upper arms, and the negative wires on the lower. Where there are only two mains, the positive is carried on the right going from the Station, and the negative on the left. The total length of wire is 8,755 miles. The mains were all completed on January 15th, and on the first test were found to be electrically perfect. The Central Station is located at the corner of First Avenue and Locust Street, Roselle, and occupies nearly a central position in the district lighted, which radiates about one-half mile each way from the Station. The building itself is a frame structure of tasteful design, and measures 39 feet 7 inches by 34 feet 10 inches, in the elear. Internally it is divided into two rooms, namely, the boiler and machinery rooms. The boiler room measures 1534 by 3934 feet, and the engine room 19 by 391/2 feet. The steam is furnished by a 150 horse-power duplex safety boiler, which is entirely enclosed with brickwork. The machinery room has capacity for four K dynamos, each with an independent engine. We have now installed and in use three K dynamos, two of which are run every night. There are up to this date 35 houses, wired for over 500 lights, connected with the system; we also have installed 150 street lamps. Some of these houses and lamps are half a mile from the Station. The platform of the railway depot is lighted by nine lamps in clusters of three each, each of the waiting rooms is lighted by a three-light electroller, and the telegraph and ticket office is lighted by a portable fixture and a wall bracket. The current was first turned on, January 19th, 1883, since which date the Station has been run every night without a hitch of any kind, the lights being perfectly steady and reliable.

WATERTOWN, NEW YORK, SMALL GENTRALE PRATION.
An exhibition jeans of one Z dynamo, with 60 A lamps, has been installed at Waterown. The Post Office, General Ticket Office, Great North Western Telegraph Company's Office, and the stores of M. E. Conge & Company, J. R. Miller, Devey & Fairlands, Wig-gins & Goodsley, J. C. Streeter & Company, and Van Namee & Company, are lighted from thin plant, which is run very satisfactorily by water notwer.

STUTTGART, GERMANY. DEPOT AND POST OFFICE LIGHTED. An installation of 1,000 lights is now being made to light the denot and Post Office at Stuttgart.

PRAISE FOR THE EDISON LIGHT. The following tribute to the Edison system is taken from an editorial in the Manufacturers Gazette, Boston, January 27th:

"Usgaining the investigation of electric lighting with so bias researches over option, with the single and no accretion, promitle, relative vas the best, sadas, and most efficient; with wide opportunities for observing the workings and the single content of the content of the single content of the content

NEW YORK "OOMMERGIAL ADVERTISER" TO BE LIGHTED. The offices and composing rooms of this newspaper are to be lighted from the Pearl Street Station as soon as the wiring can be completed. There will be 9 lamps in the offices, and 77 in the composing rooms.

And the second section of the second section s

BALTIMORE. JOHNS HOPEINS HOSPITAL TO BE WIRED.
We have received an order to wire the Johns Hopkins Hospital,
Baltimore, for the Edison light.

STEAMSHIP "ALEMEDA" TO BE LIGHTED. An order has been received from the Oceanic Steamship Company, San Francisco, for a plant of one L and one Z dynamo, 210 A lamps, to be installed on the steamship "Alemeda."

WATERLOO STATION, LONDON. PLANT INCREASED.
This plant, which originally consisted of two Z dynamos, has given
such satisfaction that it has been increased by the substitution of an
L for one of the Z dynamos.

INSTALLATIONS MADE BY THE WESTERN EDISON LIGHT COMPANY. Although this Company has been in existence but a little over six months, its business in included plants already amounts to 25 plants, aggregating about 5,000 lumps. The Company informs us that all of these plants are giving entire satisfaction.

RAYS OF INOANDESOENT AND ARC LIGHTS COM-PARED. The following extract, from a report made by Mr. L. Skeringer on his experiments in comparing the efficiency of incandescent lights and nre lights, is of interest:

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"The rays of the Edison incandescent lamp make a firmer and more lasting impression on the eye, and one more quickly received by the eye, than the rays of the are light. An analysis of the rays of the two lamps, the Edison and the are, accounts for this difference. Place Edison lights on the same pole or other support with the arc light, with the Edison light underneath and the are light over, the former will practically neutralize the rays of the are light, so that if the eye be unddenly closed, or if one turns suddenly about and faces in another direction, the impression left on the eye is that of the Edison light and not that of the arc light. One experiment made to compare the efficiency of these two systems of lighting, was to place five incandescent lights underneath a cloth canopy with the sides entirely open, in a public huilding of large dimen-sions, lighted throughout with arc lights. From every part of the building, both near by and at a distance, the eye was arrested by these few incandescent lamps, and a distinct impression was made by them upon the eye, although their aggregate candle power was insignificant as compared with that of the are lights. In small rooms the rays of the are light pierce the eye with more intensity than those of the incandescent light, but the effect upon the eye is rulnous, and practical experience shows that the eyesight is seriously injured by the proximity of the arc light. Consequently the Edison light, although it will impress itself upon the retina of the eye more strongly than the arc light, should not be placed in small rooms, or even rooms of moderate dimensions, along with the arc light. On the other hand, there need be no hesitation in lighting any two adjoining rooms, one with the Edison light and the other with the arc light, for the Edison light will not only give greater satisfaction on account of its superior purity and steadiness, last will make a deeper and more agreeable impression upon the eye. At the Paris Exposition there was a struggle for public favor between the arc and incandescent systems of lighting. The former gradually but surely lost the day, especially on account of the crudity of its glare. The presing of the are light was somewhat regained, however, by an invention of Douce & Co., who placed their are lamps in vases, the light being concealed in the wase, and reflected from a white sheet tightly stretched above it. Enormous candle power was lost by this method, the loss being so great as to make it practically worthless viewed from the stand-point of economy, but the light itself was made, by this device, nearly as moderate, although not as steady, as the incandescent light. It is not for the interest of either the are light or the incandescent light that they should be placed in the same room, especially if it is one of small or even medium dimer

NEW YORK CITY. DAKOTA AFARTMENT BUILDING. buryan, Executors of the estate of the late Edward Clark, for the wiring of the Dakota Apartment Building, now being creeted on Eighth Avenue and Seventy-second Street, for 5,000 A lamps of 16 candle power each. The work is to be done with Edison electric tubes, lead-covered wite, and the onlinary double insulated wire. The wires in the various apartments will be concealed by ornamental monthlings, to be approved by the architect, Mr. II. J. Hardienburg.

MADRID, SPAIN. FACTORY LIGHTED. 'The machine works of M. Labrador, at Madrid, are lighted with an Edison isolated plant.

SPEAMMILT LIGITUM. BAPETY OF THE EDISON SYR-ZERD DEMONSTRATED. The structure "Carolina," which is lighted by an Elisson plant, came into collidors with the British standing "Refereds" about 1, 20, AM, Jassary 26th, while on her very from Norfolk to Bultimore. The "Carolina" sustained conosiderable changes on her deck, wheel, e.e., and the outer of state-toms on the salson deck, as well as the sides of several notes regarded to the several constraints of the several controlled to the several constraints of the Bultimore Suc, Captain Wholeson the "Carolina," said; "We last an one sindicatest demonstraint of the perfect working of our Edison electric lights, which were only extengated in the demanged part of the best, thereby removing all danger of fire, which creatingly would have less probable had any other method of lightine bear multiple of the probable had any other method of lightine bear multiple with the probable had any other method of lightine bear multiple with the probable had any other method of lightine bear multiple.

NEW YORK, MR. VILLARD'S RESIDENCE. The new residence of Mr. Henry Villard, corner of Madison Avenue and Fiftieth Street, New York City, is being wired for the Edison light.

PROGRESS IN CHILE. The Central Station at Santiago is a large, handsome two-story brick building, situated at a distance of 250 feel from the Grand Plaza and business centre. The lower rooms

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are for dynamos and engines, steam being generated by holies located in the pand. The nation was opened November 4th, with a capacity of 3 Z dynamos, 1 sixty horse-power beller, and 1 a capacity of 3 Z dynamos, 1 sixty horse-power beller, and 1 a fairly artificial for a grave bolies (a of sixty horse-power each, and 1 of thirty hosse-power), believe (a fixty horse-power each, and 1 of thirty hosse-power), begieve with 2 additional Armington 8 Six me engines, intended to supply the motive power for 6 K dynamos. The current is distributed to consumers through 1, too feet of Edison underground conductors, and an equal quantity of cable. The Station is built with numan circ, the bolies being enclosed in nafety walls, and fitted with dupletter safety valves and blomban low-vactor indicates. The feed water for these bolies are may be taken from 4 different sources, and may reach the bolies through leaters, pumps or increase.

An installation is now being completed at the residence of Machane counts, Santingo, Chile, which is said to be the humbournest private edifice in South America. Three Z devanues, with engine capacity of et, are because in a building erected for the purpose in the garden, 275 feet from the louse, the current being taken to the residence, green-louse, sabiles and out-buildings by Edition underground conductors. All the fetures for this installation laws been specially made to order, and are of the fixed seight and most examples.

made to order, and are of the finest design and most expensive class.

An installation of one Z dynamo and 60 A lamps is being made at the steamship office in Lota, in the south of Chile.

The mill San Christobel, Santiago, Chile, is lighted with an Edison isolated plant of 40 A and 40 B lamps. The dynamo is driven by water power. The plant gives satisfaction in every respect.

A plant of one Z dynamo and 60 Å lamps has been installed in the flouring mill of Valdez Brothers, Buenes, Chile, to light the mill, the dwelling house of the proprietors and the street leading from the town. NEW YORK "TRUTH" LIGHTED. We are lighting the press rooms of the New York Truth with 13 lamps from the Pearl Street Central Station.

BTRASBOURG. DEPOT LIGHTED. An Edison plant has just been installed in the Depot at Strasbourg.

LAKE GEORGE, N. Y. HOTEL TO BE LIGHTED. We have received an order for a plant of 350 A lamps, to light the Green Island Hotel, Lake George.

VIENNA. IMPERIAL PALAGE PARTIALLY LIGHTED.

The following translation of a paragraph in the Paris Gauloir, February 8th. is of interest:

"Who says that the Edison light was made only to compete with gas? The Court Hall, which took place had Tuesday at the Imperial Palace, at Vienna, where gas was never permitted to be used, was exclusively lighted by the Edison system. It is recilies to say that the success was perfect."

The Paris Figure, February 8th, contained a notice of which the following is a translation:

"At the Court Ball, last Tuesday, the Grand Hall was lighted by 500 Edison lamps. The reflection of the electric light in the brilliant crystals produced a superir effect. Their Majestles were delighted, and amounced to everyone their entire satisfaction."

PHILADELPHIA. SUGAR REFINERY PLANT. We are installing a plant consisting of one Z and two I. dynamos, 360 A lamps, in the sugar refinery of Meurs. Harrison, Havemeyer & Co., Philadelphia.

ANOTHER NEWSPAPER LIGHTED. BOSTON. We have installed a plant of 173 A lights in the new building of the Boston Daily Adventur.

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- (1). One Z dynamo, with 59 A and 6 B lamps, in the newspaper offices of the Diario de la Marina, the principal newspaper in Havana.
- (2). A plant of one Z dynamo, 28 A and 74 B lamps, on the sugar estate "San Josquin," situated in the Colon Jurisdiction, and belonging to the Count de Casa Yhañez. This is the second Edison plant installed for him. After first trying the system on his "Socorro" estate (mentioned in the Sixteenth Bulletin), he decided to have a similar plant on his "San Joaquin" estate, in place of the arc light, having become convinced that the Edison light is more economical and preferable in every way than the are or any other artificial light.

PHILADELPHIA, PA. TESTIMONIAL. We have received the following testimonial in regard to the plant now in use in the worsted mills of Messrs, Clark & Keen:

"PHILADELPHIA, Feb. 15th, 1883.

THE EDITON CO. FOR ISOLATED LIGHTING OF NEW YORK.

PHILADELPHIA AGENCY:

GENTLEMEN:--In response to your enquiry, it gives us pleasure to state that the Edison Light plant of 250 lamps you installed for us in the early winter has thus far given us perfect satisfaction. We have a much lighter light than with gas, which is of vital importance to us in our manufacture of dark goods. Our operatives all like it, especially the night hands, as the air is purer to breathe, and maccompanied by the drowsy feelings resulting from gas lighting, formerly used in the mill. In addition to this, our saving from the use of electricity on the Edison system, over our gas bills, will in the first year repay the cost of your whole plant.

It gives us pleasure to add that you have fully carried out all that you have promised us.

Yours truly

CLARK & KEEN."

LOUISVILLE. KENTUCKY. WOOLEN MILL PLANT. We are installing a plant consisting of one K dynamo, and 250 A lights at Louisville, in the mill of the Old Kentucky Woolen Mills

LHILADELPHIA. SHIP YARD PLANT. We have received an order from Lieut Commander H. H. Gorringe, or a plant of two L dynamos, and 350 A lamps, to light the ship yards of the American . Ship Building Co., at Port Richmond, Philadelphia.

NEW YORK OITY, HAWTHORNE FLATS WIRED. We have just completed the wiring of the Hawthorne Apartment House, at 59th Street between Sixth and Seventh Avenues, for 900 A lamps, an average of go lainns per floor. All the wiring is concealed,

VILLAGE PLANT FOR BROCKTON, MASS. The Edison Electric Illuminating Company of Brockton has been organized to light the city of Brockton, from un Edison Central Station, on the Village Plant system. The officers and directors of such company are as follows:

Charles Goddard White, President; William Lloyd Garrison, Treasurer and Clerk; William J. Jenks, Mauager; Directors; Charles Goddard White, George P. Denny, C. B. Prescott, James B. Tolman, and F. J. Coburn.

A canvass of the town has been made, an estimate firmished, and an order given to us by the Brockton Company for a Central Station of 4,800 A lights.

THE EDISON EXHIBIT AT MUNICH. The following is an extract from the London Engineering:

"At each exhibition of electricity the Edison Company has been compleuous by the number and varieties of its exhibits, and at Munich it again main tained its reputation by a lavish display of lamps. In a half situated at the angle

DETROIT, MICHIGAN. DRY-GOODS STORE PLANT. The following is an extract from the Evening News, Detroit, January 29th:

"The introduction of the Editon incundencest light in Deriot was witnessed by a large through of people on Standby neight at Metall Box. & Cofdry goods and Standby it was und in operation, and from 5 to 10 p. in. the Editor were place and the Editor of the Company of the Company of the Section there was quite lening. There are SS lamps on the promod floor, and the Secte there was quite lening. There are SS lamps to the product of the the Section of the Company of the Company of the Company of the there was a section of the Company of the Company of the Company perceptible variation or fleker, and the member y second to work to a form."

A BAD FAILURE OF GAS. We take the following paragraph relating to a failure of gas at Halifax, Eugland, from the London Electrician, February toth:

"On the creating of Felday, the add Inst., a large our of the towns (Indian was studied) deprived of light are they in a fallow in the gave in Hallow and the studied of the studied of the studied was studied and a factorise that the town was the studied was studied and factorise that to supe working, the relayer studies were their their case, and generally fridge were unconfinable in Indian or Priday centils, each studied was studied to the studied of the studied of

NEW YORK CITY. APARTMENT HOUSE WIRED. We are now wiring the Apartment Building known as One Hundred and Twenty One Madison Avenue, for about 1, 200 lights, the work being entirely concealed. The building is 11 stories high, there being an average of 100 lamss ter floor.

MILWAUKEE. THE BEST BREWERY PLANT. The following extracts are taken from the Republican Sentinel, Milwaukee:

"On Samuly one section of the Ethion Ight including was section in the infinition of the Thing Both Berleving Company, and, in about 100 works, you Dilaton glades will be in spectation. In which the North Both Things are in the Samulation Ight was the foreign and the Inhibitor, and Floritoria Palori resilience, there are to be ago admitted light to the Samulation Inhibitorial Samulation Inhibitorial Samulation Ight was the Samulation Inhibitorial Samulation of the contrast of Committed and Comfidence, in the Inhibitorial Samulation of the contrast was good per admittant and the Inhibitorial Samulation of the contrast was good per admittant and the Inhibitorial Samulation of the contrast was good per admittant and the Inhibitorial Samulation of the contrast was good per admittant was the Inhibitorial Samulation of the Committee of Samulation of the Committee of Samulation of Samulation

APPLETON. HOTEL TESTIMONIAL. The following letter, from Mr. Cottrill, Waverley House, Appleton, Wis., shows what he thinks of our light :

"WAVERLEY HOUSE, February 15th, 1883. GEORGE H. BLISS, Esq., Supt.

WESTERN EDISON LIGHT COMPANY, Caucaso, III.

DRAR Six:—The Edison Intradescent lamps have been in use in my Hotel since the 16th of January last. The light is much more brilliant, uniform, without odor, also fire-proof, than any gas that ever was manufactured. The convenience and the economy must in time bring this lamp into general use. The lamp is perfect, as there is not the slightest oscillation.

hi short, it gives me perfect satisfaction, and you have my warmest wishes for your success.

W. H. COTTRILL."

NEW YORK. WESTERN UNION TELEGRAPH BUILDING LIGHTED. The building of the Western Union Telegraph Company, Dey Street and Broadway, is to be lighted from the Pearl Street Station by a special conductor running down John Street, and connected with the net-work of conductors in the First District, at Nassau Street. The building is being wired for 345 lamps, but for the present only about 255 will be used, distributed somewhat as follows:

Rooms of the Associated Press	-		55	lar
Operating Room			107	
Second Floor			55	,
flalls			8	•
First Floor, No. 8 Dey Street	-		15	
Second Floor, No. 8 Dev Street			15	•
Total, .	-	-	255	

EUROPEAN COMPANY'S THIRD BULLETIN, We have received copies of the Third Bulletin, February 15th, of the Compagnic Continentale Edison, 33 Avenue de l'Opera, Paris. It is a

document of 20 pages, and contains a list of recent installations of isolated plants, and of central stations in progress of being installed, together with interesting information showing the success of the European Company.

DIJON, FRANCE. A CENTRAL STATION PLANT. A smacentral station plant, to be composed of K dynamos and Armington & Sims engines, is to be at once installed in Dijon. It will be started with about 1, 100 lights, and will be subsequently increased.

PEMBERTON MILL PLANT AGAIN. By permission of Mr. W. L. Garrison, we take the following extracts from a letter written to him by Mr. F. E. Clarke, in reply to an inquiry as to the efficiency and economy of the Edison plant in the Pemberton Mill, Lawrence, Mass:

"We put in one Z dynamo, 65 A or 120 li lights, in October, 1881, and at first tried the 120 B lights with it, lighting 120 looms, with one light to a local. From what I saw in New York, I became convinced that the A lamp, using half as many, would serve us better, consequently I made the change, getting 65 A lamps in running order in January, 1882. With these A lamps we lighted 130 looms. The many advantages of the light, some of which were -almost perfect condition of the atmosphere when using no gas jets, discrimination of colors, little imperfections in weaving remedied more quickly by the seaver, a better diffusion of light among the machinery, enabling quicker renewing of warps in looms, and quicker repairing of breaks in warps ur machinery-all of which were experienced in using the light through the winter of 1881 and 1882, and up to September of 1882-decided me to increase the number of lights so as to light wholly two entire weaving resum I therefore contracted for 2 f. dynamos, 150 lights each, giving me in all 365 A lights. These were all in operation early in November, 1882, and have been in use continually slace. After a week's use I had taken out of the two rooms all of the gas jets except 4 in each room, which are used in case of rooms an or the gav jets except a m count may be occasioned among the help-stopping of electric lights, that no panic may be occasioned among the help-The electric machines are driven by the regular power of the mill (water wheels), and once in a while a short stop is necessary from some breakage of shaft or large belt, etc.; hence, the few gas jets spoken of above. The operation of the machines and lights through the mill thus far have been very satis-

factory. We make colored goods largely. Our weave moms are wide, and dark days, and in fact, nearly, if not quite, every day we have used a part of the lights all day. The difference in the atmospheric condition of the rooms from what they were when we used gas, is almost indescribable. In the evening, when all lighted, the air is as pure to the health and sight as it is in the full sunlight.

I have the light at my desk in the office, and its steadiness, and the alsence of heat rays, make it very pleasant, and I am able to write and read as long as I choose, without any inconvenience to my eyes. * * * Now for comparative economy of gas and electricity.

We have 365 A lights. We used during January, 1883, 135 lamps all day (10 hours). We used during January, 1883, 230 lamps, 2 hours each day, equivalent to 181 lumps all day, 10 hours each day, as we

displaced 2 gas jets with each A light, we displaced 362 gas 362 gas jets, 10 hours, 4 feet per hour, gives 14,4% feet gas.

14,480 feet gas, at \$1.65 per thousand, == \$23.89 as daily cost of gas to obtain a poorer light.

Electric plant cost entire, \$6,825,60.

12 per cent. of 6,825.60 for interest and depreciation, one day \$ 2.73 Power eight-tenths of one cent, per 11. P. per hour, for Lamps, 181 lights; renewal 4 lamps daily.

\$10.22

\$10.22 cost daily of tS1 lamps to hours per day."

NEW YORK, FIRE ENGINE HOUSE LIGHTED. We have installed 22 Edison lamps in Engine House No. 32, located at No. 108 John Street, which will be supplied from the Edison Central Station on Pearl Street. The following ingenious application of the light has been arranged in this installation. Connected with the firegong, is an automatic device by which the horses are unhitched simultaneously with the sounding of an alarm, and this same device is made to operate a switch for completing the electric circuit, and so turning on the lights. When, therefore, an slarm is sounded

during the night, the ground floor and the sleeping apartments are instantly lighted automatically, so that the men and the horses have only to jump to their places, thus obviating the necessity of stopping to light up.

WILLIAMSPORT, PA. EXHIBITION PLANT. The following extract from the Williamsport Daily Sun and Banner, of March 19th, relates to a small plant installed by the Edison Company of that city for exhibition purposes:

"The announcement that a number of business places would be lighted up on Saturday evening by the new Edison electric light, brought out quite a crowd of people to the vicinity of Market Square. The stores in which the light war exhibited, were those of D. S. Andres & Co., Beck Bros. & Co., J. T. Little, Lloyd, and the Star Clothing House. The light is far superior to that which has been furnished to some of the business houses during part of the winter; in fact, the latter will bear no comparison to the Edison, which emits a steady mellow light, not the least dazzling, and without any apparent had effect open the eyes. About five thousand people must have witnessed the light on Saturday night, and the opinion given here, was the unanimous opin-ion of the crowd. It is the intention of the Company to make the Edison light a permanent fixture of the city, and will at once proceed to canvass the city for subscribers. They claim that its cost will be little above that of gas, while the superiority of the light should commend it even for domestic purposes. The company is composed of Abram Underraff, I. I. Coxker, W. H. Sloon, II. C. McCormick, J. C. Hill, James J. Glisen, Dr. B. H. Detwiler, W. L. Parker, J. B. Coryell, William Gibson, J. A. Beeber, and P. B. Shaw."

The extract below is taken from the Williamsport Daily Gazette and Bulldin, of the same date:

"The object of the Company in exhibiting the light Saturday night was to show to our citizens the character of the light, and the system under which it is supplied to consumers, its safety, economy, practicability, superior brilliancy and adaptability to domestic purposes, as well as to illustrate its cleanliness, absence of heat and flickering, and all other objectionable featares of gas. This purpose was accomplished in the highest degree, as evidenced by the enthusiasm expressed by more than five thousand people who turned out to witness for the first time an incandescent electric light.

ENGLAND. PROGRESS OF THE EDISON LIGHT. Previous Bulletins have contained lists of plants installed in the United States and on the Continent of Europe, aggregating at the date of the last Bulletin 272 plants, 52,586 lamps. Below is a report just received from London, showing also the Edison plants either installed, or in process of installation, by the Lomlon Company, and by the Manchester Company:

INSTALLATIONS BY THE LONDON COMPANY.	LAMIN.
Central Station, Holborn Viaduct, London	950
Consolidated Telephone Company, London	120
Robey & Co., Fagineers, Lincoln	120
Archibald Coats Esq., Woodside, Paisley, N. B	130
T. Taylor Smith, Esp., Bush Hill Park, Enfield	65
B. Verity & Sons, Electric Light Fittings, London.	65
Waterloo Station, L. & S. W. Railway Co., London	200
City and Guids of London Technical College, Finsbury, London	200
	1,000
Dining rooms and Library of the House of Commons, Westminster.	150
S. S. "Tarawera," Union S. S. Co. of New Zealand	100
S. S. "Walhora," " "	150
S. S. "Pateena," Tasmanian Stram Navigation Co	100
S. S. "Rio Panlo," Brazilian Steamship Co	65
S. S. "Río Parana," " "	65
S. S. "Apollo," Compagnie La Plateuse	ıSo
S. S. "Minerva," " "	180
S. S. "Clan Macarthur," Clan Line	150
11. M. S. Troopship "Malabar"	373
-	
INSTALLATIONS BY MANDIESTER COMPANY.	4,463
Show-room & Offices, 7, St. Mary's Gate, Manchester	. 00
Mather & Platt, Engineers, Salford	
D. Moseley & Sons, India Rubber Manufacturers, Manchester.	1,000
Wright, Turner & Son, Spinners, Salford	000
George Hopwood, Manufacturer, Birtles Dean	120
Gottschalek & Co., Merchants, Manchester	120
The "Harrison 11 Patent Steam Steering Co., Salford	70
Theatre Royal, Manchester	500
Manchester " Guardian," Editor's & Compositors' rooms	120
Manchester "Royal Institution," Picture Gallery	80 4

EDISON LAMPS USED WITH OTHER DYNAMOS. Phillips Bros., Wire Manufacturers, Hackney Wick, near London. . 130 South Coast Railway, and on the fast passenger steamers of the same company to France, the lamps in both cases being fed by Faure accumulators. SCMMARY. Total..... S.413

CROSS-MANUCULARCE PARTICIPATION OF THE STATE OF THE STATE

NEW YORK CITY. MR. TILDEN'S RESIDENCE WIRED. The residence of Hon. Samuel J. Tiklen, No. 13 Gramercy Park, has been wired by us for 150 Edison lights, all wires being concealed by ornamental monldings.

CONTRACTS CLOSED BY WESTERN EDISON LIGHT CO. Since the last Bulletin, the following plants have been sold by the Western Edison Light Company:

- (1). A plant of one Z dynamo and 60 A lamps, for lighting the Merchants' National Bank, Chicago.
- (2). A plant of one Z dynamo and 60 A lamps, to be installed in the Star and Crescent Flouring Mills.
- (3). The plant for the American Express Company's Offices, Chicago, has been increased from one L dynamo, 150 A lights, to one K dynamo and 250 A lights.

A GAS NEWSPAPER ON GAS. ADVERSE CRITICISM. The following is an extract from American correspondence in the London Journal of Gas Lighting, December 12th:

"One thing that will operate in Edison's favour, when he gets to work in earnest to light the down-town district, is that this section of the city is suppiled with water-gas. This gas gives a great deal of trouble by causing the (325)

TESTIMONIAL FROM NATIONAL TUBE WORKS. The following letter is from the National Tube Works Company, McKeesport, Pai, in reply to a letter from our Company inquiring if the report was true that our isolated plant was not giving satisfaction.

"McKermout, Pa., Feb. 14th, 1883.
Ednoon Company for Bolated Lighting.

New York City.

GENTLEMENT—I am in receipt of your valued favor of the 5th tast, reporting a story in circulation that the Edison Electric Plant at our Works has not vivous attication etc., etc.

I have before me the written report of our mechanical engineer, and beg to subsuit it in answer to the remor you report?

'In reply to your request for a report on Mr. Clark's letter, I would state that we are using the Edison Light regularly every night, and have been so using it ever sluce the plant was installed, with the exception of a few weeks during the past summer, when our mills were shut down, owing to the strike among the iron workers. The plant is working to our entire satisfaction. We have in all 65 lamps, but at present are only using one-half that number. because the department in which they are placed, is not running full at this time. Since the resistance box was changed, we have experienced no difficulty whatever in regulating the light according to the number of imaps we wish to use; we run the dynamo direct from our main engine, which gives us a very steady light. The engine is of the upright class, 275 horse-power, and makes 50 revulations per minute; its speed is very regular, and does not vary over one or two revolutions per minute at any time; when we first installed the plant, we put in a small engine so that we could run either from the small rugine or from the main engine, but the results were so much more satisfactory from the main engine, that we removed the small one. The dynamo is placed near the engine-room, and is under the charge of our engineer, who has to attend to it in addition to his regular duties; his shift is tt hours, and during that time it does not take more than fifteen minutes of his attention, so that the care of this plant is very slight,"

From the above you will observe that there is no truth in the rumors that

We would suggest your calling on our General Manager, Mr. J. H. Flagler, at No. 104 John St., on the subject of the lighting our yards with the Edison

Yours truly, E. C. CONVERSE, Assistant General Manager."

PHILADELPHIA, PA. WOOLEN MILL TESTIMONIAL. The following is a copy of a letter received by us:

"PHILADELPHIA, March 5th, 1883.

TO THE EDBON COMPANY FOR ISOLATED LIGHTIM.

GENTLEMEN:—Our Editon Electric Light plant of 500 lamps, which you have familished to us, has been used by ut this winter with great success. The

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lighting of our mill has been such that we use it for all night work on our darkest goods (thicks worsted yarms) with such ashfortain, and with great concessor. We not an use true can of our darkest, each out to of coal we find ample for four handred lamps running for fifteen hours. The absence of feast we have the superior at cased by gas harmors in very natiscable in the effect on the algebra of garanteed by gas harmors in very natiscable in the effect on the algebra of garantees, who are better able to attend to their work in consequence, which is the contradiction of the contradiction o

Vours respectfully, FISS, BANES, ERBEN & CO."

LENNI, PA. TESTIMONIAL. We have received the following testimonial relating to the plant installed for the Parkmount Mill Company:

"LENNI, PA., March 3d, 1883.

ROSON COMPANY FOR ISOLATED LIMITING.

FEAR SIRES—We have been lighted 16t hours with the Edison Electric
Light. Have had five lamps broken. We are very much pleased with the
lighs.

Vours truly,

THE PARKMOUNT MILL CO., Per Gro. Bayes."

STEAMER "PLIGHER" PLANT. The plant on the "Pilgerin" ledenging to the OHI Colony Steamboat Company, mentioned in the Fourteenth Bullein, is finished. It consists of 910 kmps, one L, and two K dynamos, (with a cupacity of 11,356 candle power), and two Armington & Sims engines (one 38 ½ by 10 lengine, and two Armington & Sims engines (one 38 ½ by 10 lengine, and one 9½ by 12 C engine), helical directly to the dynamos. Steam is emislated by a special boiler of about 95 H. Pt. capacity, with 50 pounts pressure; steam connections are also made with the donkey boiler, and with the ship's unith boiler, for emergencies. The dynamos can be used either together or separately, and are regulated by the Edition automatic regulator. The current is taken from the dynamos to the main deek by an Edition electric tube, running ventically on the forward side of a mast to the ceiling of the main deck, and there dividing to each side of the boat. Each branch then runs aft to the centre of the loat, whence all run vertically to the ceiling of the gallery deek. Care has been taken throughout the whole wiring to provide such a system as to prevent the lights from being extinguished by an accident to the boat, and, to that end, the wiring has been divided into four sections, each of which is entirely independent of the others, and each is furnished with its own proper complement of safety appliances. Each firture, whether it be a large chandelier in one of the saloons, or a single light in a stateroom, is also furnished with the Edison safety-catch. The grand saloon is illuminated by one large chandelier of 36 lights, and two chandeliers of 27 lights each, each chandelier having four tiers of lights, every tier being controlled by a separate switch, and each chandelier being supplied from two separate sections of conductors. There are also on the saloon deck three small electroliers of 8 lights each, four newel-post fixtures, five two-light brackets in each side passage, and four additional two-light brackets at other points. The gallery deck receives the greater portion of its light from the large electrolier in the main saloon, and has also one eight-light, and one twelve-light electrolier, five brackets in the side passages, and one four-light bracket aft. The remainder of the lamps are distributed in the social hall, the quarter deck, dining saloon, freight deck, engine and hoiler room, fire room, barber's shop, captain's office, kitchen, pantry, officers' quarters, staterooms, and miscellaneous portions of the boat, there being no gas or other light on the vessel.

The plant is what is known as the Edison "A" system, with an electro-motive force of 110 volts, the lamps used being of 16 and 10 candle power, as required. The total number of lamps is distributed about as follows, viz.:

Gallery and	Grand Saloon199	250
Main Deck		138

NEW HAVEN STEAMBOAT PIER LIGHTED. We are now lighting this Pier with 43 lamps from the Central Station on Pearl Street. There are 5 lamps in the upper office, 4 in the lower office, 29 on the pier, and a five-light cluster over the main entrance to the pier, The circuits are run in divisions of five, each controlled by a separate switch.

STEAMSHIP "TARAWERA" PLANT. We learn from London thet a report from the Captain of the "Transvera" states that the Elison plant worked well throughout the voyage from Greenock, Scotland, to Melhourne, Australia, and that only to of the 150 lamps broke on the passage.

OANMAD. CORNWALL STILL LIGHTED. The Conwall Mill, belonging to the Cambian Gotton Company, Corrental Mill, belonging to the Cambian Gotton Company, Corrental Mill, belonging to the Cambian Gotton Campano, Eff A. and 3 Biemps. The Legges number of haups is in the "Warve Shol," a strature goo feet long and 120 feet with the "Warve Shol," a strature goo feet long and 120 feet with the still patched by any lighten supposed from the Gotton Cornel feet from the floor. The emaining lights are distributed through the picker room, engine room, and offices. The lights are o managed as to be turned off by convenient switches, in groups or about go

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OLEVELAND. WILSHIRE BUILDING LIGHTED. We have installed a plant of one K and one l. dynamo, with 400 A lamps, in the Wishire Building, Cleveland, Ohio, belonging to Mr. J. B. Perkins

LONDON, ENGLAND. HOLDORN RESTAURANT LIGHTED. This plant, which consists of two R dynamos, and about 1,000 lamps, chiefly B, has recently been completed, and is now minning. The restaurant has been handsomely redecorated, and the success of the light is perfect.

HOUSE OF COMMONS. LONDON. The Edison London Company is installing a plant of one L dynamo, and 150 A lamps, to light the library and dining room of the House of Commons during the ensuing session.

NEW YORK. "MAIL AND EXPRESS" TO BE LIGHTED.
We are installing at a large in the press rooms and offices of the
Evening Mal and Express, which will be lighted from the Pard Street
Station. There are several other departments of this neesspaper where
artificial light in not used during the spring and summer months,
but which will be equipped with larges in the auturn.

TESTIMONIAL FROM ANAMOSA. By permission of Mr. Swinyard, we print the following from the Warden of the Anamosa, Iowa, negitentiary:

"ANAMOSA, February 20th, 1883.

THOMAS SWINVARD, Esq., Vice-President Dominion Telegraph Co.,

Hamilton Cantill.

Than Six :—Yours of the 5th instant received in due time. I should have answered before if I had been an borne-heure the delay.

In answer to the foughties as to the result of our further experiments, I, will say that it encest say fonded a operations, and would not do without the light for refer what It has cost. It gives us no trouble in any manner what every and other its better than all, we have light wherever we want. In When we do not wish to use all the lights, we use exactly the number that is received.

,311

Our Beglet and Dynamo are run and taken care of by a Convict on that we are untiling on for labor. We she that any outlary remediate can man all take care of the foreign for a labor of the service of the modelinery. There is not the killshoot object of the service of the service. We will write part in June 10 service of the service o

A. E. MARTIN, Wanten."

EDISON'S FACTORY IN FRANCE. MR. BATCHELOR COMPLIMENTED. The following compliment to Mr. Batchelor appeared in La Lumière Electrique, in an article written by M. Th. Du Moncel:

"The establishment of the Ellion Company, at Irry nor fisher, is very menthal in core propert; it is where the electrical approxime in nameliatured which enters into the Ellions system of lighting. We have already electrical in an under of this paper, August 12th, 1882, a long article to the description of this Euroy at Irry, and we will now simply adult that the Europe and the electrical interpretation of the Europe and Ellion and Ellion and Ellion (event by virg. are whenee, and that the portion of the Europe which is received by virg. are whenee, and that the portion of the Europe which is received as a second of the ellipse and the portion of the Ellion of the received and a second of the ellipse and the ellipse and the ellipse and ellipse and the ellipse and the ellipse and the ellipse and the ellipse and ellipse and the ellipse and ellips

PROGRESS IN MANORIESTER, ENGLAND. A small control sation has been established by the Manchester and District Edison Electric Light Company, Limited, in Mount Street, in that city, from which it is proposed to supply the public buildings etc., in the neighborhood, as soon as permission to cross streets with conductors is obtained from the Manchester corporation. There are now installed in this station four K dynamon. In its intended, two hundred and fifty lights each; also it X dynamo. It is intended, however, to extend the capacity of this station to 10,000 fights. The motive power is supplied by two high and low-pensure engines, specially designed by Mesers. Mather & Plant, of the Salford Iron Works, stem being furnished by three bollers of the semi-portable, multi-tubular true.

CHARLES WAS A

In connection with the plant in the composing and editorial rooms of the Manchester Guardian, we take the following extract from a late issue of The Gip, a newspaper published in London:

"The compositors state that not only is the light more agreeable to work ly, but that they no longer unifor from bothlude, we show gas was noted. One evening lately, was necessary to resort for an low or or two the old most lighting, while some light requires to the engine were being made. As soon as these were completed, the re-appearance of the electric light was greeted with a general electr."

The following is an extract of the Electrical Review, London, January 27th:

"The Mancheste and Hustic Elibon Herre Elifo Coupuly had been depth that the Royal in hist cive will do of His-has insurance lamps. The work has been show under the present deretion of Mr. Kulled and Mr. A. F. Gerener. The undered of the insulincence lamps, each with a sized Biominiating power epoil to detect underly, which will do not be a sized Biominiating power epoil to detect underly, which will desire the size of the size of the size of the size of the contract of the size of the contract power power, and elibonate in their parts of the boson. In the crediting of the dree, citizing power, and the size of the contract power and the price of nickly land Bioministic the bistore in a way entirely beyond comparison while gas a formerly med. We sander and it is contemplated to object the case useful of the first first and in the contemplate of the first size of the size of the first size of the size of the size of the first size of the size of the size of the first size of the first size of the size

NEW YORK OLTY. FULTON MARKET. We are lighting the stall of Fish Commissioner Blackford, Falton Market, from the Central Station in the First District. At the exhibition of live trout given by Mr. Blackford on the 2st of April, the tanks containing the fish were lighted by means of Elison lamps submerged in the water.

LONDON. SUGGESS OF OUR STREET LIGHTING. The following is an extract from the Report on Works executed during the year 1883, by the Hon. the Commissioners of Sewers of the City of London:

"The arrangements entered into with the Edison Company for lighting with their incandescent lamps the public way of the Holloom Viaduct were carried out, and that theroughlare was lighted for three mouths, from the 24th April, free of cost to the Commission.

At the explosition of that these the Company applied for permission to continuous the lighting on a further peed of characters, the Commission to pay them the same amount as they remail have had only the continuous payment of the company them the same amount as they remail have had only the continuous angested to an all the content two as subficiently as the content for an expected in a continuous three contents for an expect and appealing that the public way and the same price content for the payment, and appealing that the public way and the same price content for the payment and present the content for the payment and present the content for the payment of the content for the payment of the payment

ha addition to lighting the public ways, the Edison incandescent lights were introduced into nearly all the private holidings and shops fronting the Viadoct, the Edison Company making their ownarrangements with the various occupiers.

When the experiment was commenced, the Edison Company placed two insufficient to the public gas latterns; they have since under various experiments with different altapoal batterns and different arrangements of closures of incandescent lamps, but of which it is scarcely necessary to give he desalls lever, as it will be referred to more fully in a special report on the

This is the first instance in London of a public thoroughfare leding lighted be object sought is the uniform diffusion of light over the entitle surface of the street, which is isolated the only sound principle of lighting important public thoroughfaren.

MAINE. A TANNERY LIGHTED. We are installing a plant of one Z dynamo, and 60 A lamps, in the tannery of Messrs. F. Shaw & Brother at Grand Lake Stream, Maine.

STATE HOURE LIGHTED, BOSTON, MANS. We have installed a plant of one Z dynamo with sixty A lamps in the State House a Botton. At present the lights are all used in the House of Representatives. The House is it by an electrolic containing temp-free lamps, supended from the centre of the done, and by a funnther of two and three-light brackets. On each of the electric decks is a possible library lamp, and in the repoter's gallery are decks is a possible library lamp, and in the repoter's gallery are

three lamps arranged on futures similar to the ordinary student's lamp. These wafous circuits come as a wisel-board nare the doctor-keeperd's desk, from whense the lights may be turned un and off, in groups of ordious numbers, at pleasure. The dynamo is placed in the eights room, and is driven by the eights need to drive the evail-lailing blowers. The House was formerly lighted by gas, and when a senion was at all producingd, the heat and impure air produced by the gas jest rendered the amosphere exceedingly unconformals. The Mildon light as given great satisfaction, bade on account of the increased illumination, as well as by the fix that the purity of the air and heat of the room are not at all affected by its use.

SEVENTEEN DAYS' CONTINUOUS RUN OF AN ENGINE AT THE CENTRAL STATION. We quote the following from the New York Evening Tilggram, March 27th, relating to a test of one of the engines at the Central Station, First District:

"This morning at half-past five the men on duty in the Edison lighting station at Pearl and Folion Streets, startled the quiet of dawning by a wild cheer and cries of 'Bully for the Lawrence. She's done it this time if she never does it again.' With them was a Telegrass reporter, who shood, watch in hand, waiting for the half hour, and whose amountement of the time was the cause of the sudden explosion of rejoicing. They were all, reporter and engine men, grouned around an engine used for giving force to the dynamo electric arrangement of armature and commutator, which furnishes light to late workers, such as journalists, in the lower part of town. The engine in question had performed the feat of running at a speed of 350 revolutions per minute, for the space of sixteen days and sixteen hours, without any cessation. The chief engineer, Mr. Vanderveer, said: - 'Mr. Edison was among the first to use high-speed stationary engines. He reflected that a becomotive of 200 horse power, when making a mile a minute, as such engines often do, both with trains and without them, was compelled necessarily to make 300 strokes a minute, and this, too, often over a roadled whose inequalities must cause consklerable vibration. So he-ordered from Armington & Sins, of Providence, R. L., an engine of 350 revolutions, and of 175 horse power, because, obviously, the stationary engine could attain high specif with greater safety than the At first we had some difficulty in oiling certain parts liable to get heated and hand to come at, such as the crank pin of the balance wheel, and

the pin of the eccentric is the governing wheel. But I introduced a modification of the can that catelors the oil. Perhans without this she could not have run for this length of time without stopping. Mr. Edison calculated that if she can sixteen plays and sixteen bours. It would be convalent to a run around the circumference of the globe, 24,000 miles. She is going at a rate equivalent to sixty miles an hour. Multiply that by twenty-four, and we get 1,440 miles for her day's run. Multiply that again by sixteen and two-thirds days, and we get 24,000.

'And when will you stop her?' asked the Telegram reporter.

'This afternoon, when she will have completed seventeen full days. She started Saturday, the toth of this month. Before this run she went eleven and one-half days without stonning." "

BOSTON "ADVERTISER" PLANT. We take the following extract from the Daily Advertiser, Boston, February 19th, relating to the plant installed in the premises of this newspaper :

"The Advertiser will enjoy at night a very different light from what it was familiar with in its punthful days. From the days of tallow candles and whale oil, it has passed through gas to electricity, and now sees its busy toilers working under the new Edison lights. In the basement is a large machine for the generation of electricity, and in the different departments are more than one innolred and fifty of these brilliant pear-shaped glass builts shining with the thread of fire. Steady and soft, this light also possesses the merits of not heating the air, and of not lumning up the oxygen which is so essential in a thriving brain-working establishment. This light is used in only one other newspaper office in this city-the Herald,-and elsewhere than in Boston it is used in the following newspaper offices: The New York Times, New York Herald, Baltimore Sun, Philadelphia Lolger, Ohio State Journal, and Philadelphia Record, as well as in many other newspaper and printing offices. The machine, which is in the basement of the Advertiser building, is different from any other in use in this part of the State, and is the most nearly perfect of any yet made."

HOW GAS VITIATES THE AIR. Dr. Lethby, in "Newbigging's Hand Book for Gas Engineers" is the authority for the statement that a gas jet giving 12 candles of light gives off 2,155,364 foot pounds of energy per hour, or will heat 2,786 pounds of water one degree Fahrenheit in one hour. The same gas jet consumes 5.45 cubic feet of oxygen, produces 3.21 cubic feet of carbonic acid, and vitiates 80, 2 cubic feet of air in the same time. (116)

DANGER FROM GAS. Several gas explosions, caused by leakage of gas mains, took place near Twentieth and Brown Streets. Philadelphia, at an early hour on the morning of October 19th, One explosion in a defective main blew out an iron grating at Twentieth and Ogden Streets, threw it 100 feet into the air and tore out the earth and stones around. A minute later a similar explosion followed one square away, at Twentieth and Polar Streets. A third explosion followed at Twentieth and Parish Streets, and a fourth at Twentieth and Brown. Flames then burst out at several places. throwing volumes of fire into the street. The houses were shaken within a radius of several squares and great excitement ensued. Many were injured. * * * The street lamp at the corner of Fulton and Greene Avenues. Brooklyn, being filled with eas through a leak in the pipe early in the morning of October 19th, before the lights were extinguished, exploded, blowing the lamp to pieces, * * * Thomas C. Hoagland, a traveling agent for a New York wholesale warehouse, was found October 16th, in his room at the American House, Dover, N. H., asphyxiated by escaping gas. * * * On the 27th January, a serious explosion of escaping gas occurred in a man-hole of the American Steam Heating Co., at Broadway, and Maiden Lane, New York City. The two covers of the man-hole were blown with a great noise in fragments to a height of over a hundred feet. A broad sheet of fire and clouds of smoke came out of the man-hole. Windows on the third and fourth floors of the building on the northeast corner were broken, and the glass fell into the street with pieces of the man-hole covers. Water W. Hunt and Nathan Simon were injured and taken to the hospital. Several other persons were partly stunned; among them Jeremiah Consellor, of Newark, N. J. * * * A gas explosion took place at the residence of Lady Brooks, No. 82 Ecclesion Square, London, England, wrecking part of the house, causing a slight fire, and also

doing damage to other property in the neighborhood. Lenisa Bloomfield and Ursula Bloomfield were considerably burned in several parts of the body, the former seriously. * * * On January toth an explosion of gus occurred in Onces Anne Street United Presbyterian Church, Dunfermline, Scotland. The force of the explosion blew out the six windows of the session house, lifted the roof from its position, and did considerable damage to the church itself. *** On the 25th January, an explosion, caused by escaping gas, occurred in the purifying room of the gas works, at Lansing, Michigan, making almost a complete wreck of the building. The roof was blown some distance in the air, turned round, and completely shattered. The South gable wall was prostrated, falling upon a two-story brick cooper shop adjoining, crushing it to the ground. * * * On Jannary 26th, escaping gas, which had accumulated in a man-hole at the corner of Fulton and Nassan Streets, New York City, exploded, throwing an iron man-hole box, which was about four feet square, with the heavy granite cross-walk pavement blocks, bricks and Belgian paving stones, in a shower over the Street. Several persons were thrown down by the force of the explosion. John Hess and Lewis Bear were struck by paving stones, and injured. A. Schuchner was passing over the spot at the moment of the explosion, and was thrown by its force to the opposite side of the street, suffering a severe surain of the right leg. * * * A reservoir, situated on Washington Street, Eastnort, Maine, became filled with gas from a defect in the pipe running by it. The escaping gas became ignited and a tremendous explosion occurred. Twenty feet of the street were torn up, and the cover of the reservoir wasthrown 60 feet high, crashing through the roof of a factory, 175 feet away. Two boys and a man were blown several feet into the air, but were uninjured. * * * Fire, doing damage to the extent of \$400, was caused by a lighted gas jet, January 20th, at 109 Fourth Street, San Francisco, Cal. * * * A

fire was caused January 28th, at 1398 Second Avenue, N. Y. by artificial flowers coming in contact with a gas jet. * * * On February 1st a fire occurred at 134 West 22d Street, N. V. caused by a curtain coming in contact with a lighted gas jet. Damage \$200. * * * A curtain, coming in contact with a lighted gas jet at 15 West 52d Street, N. Y., February 7th, caused a fire resulting in a loss of \$3,000. * * * A fire was caused by a lighted gas jet in the store 716 Third Avenue, N. V., February 9th. * * * A fire, caused by the explosion of a gas meter, occurred February 12th, at 105 Broome Street, N. Y., doing damage to the extent of \$300. * * * A curtain caught fire from a gas jet at 222 Greene Street, New York City, February 13th, causing a fire which did damage to the amount of over \$500. * * * A fire occurred in the carding room of the Dudley Hosiery Mills at Newton Lower Falls, Mass., February 19th, having been caused by a gas light. The damage to building, stock, and machinery, was \$5,000. * * * At 21SS Third Avenue, N. Y., on February 21st, a fire was caused by a gas jet in the window of Garnett Cohen coming in contact with goods. * * * The window curtains in a hedroom in the residence of Mr. M. I. Townsend Burden, 111 Fifth Avenue, N. Y., took fire from a gas light, February 22d. The damage was estimated at \$3co. * * * Goods in the show window of W. H. L. Jones & Co., 339 Eighth Avenue, N. Y., caught fire from a gas jet February 27th, doing damage to the amount of \$100. * * * A window curtain, coming in contact with a gas jet, caused a fire at 109 East 70th Street, N. Y., March 1st. * * * The explosion of a gas jet at 273 Bridge Street, Brooklyn, N. Y , March 3d, caused a fire and loss to the extent of \$100. * * * A fire occurred, March 8th, at 39 Prospect Place, Brooklyn, by a window curtain coming in contact with a gas jet. * * * Window curtains, catching fire from a gas jet, caused some slight damage at 208 East 48th Street, N. Y., March 11th. * * * A lighted gas let

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set fire to a curtain at 128 Fourth Avenue, Brooklyn, March 13th, doing damage to the extent of \$100. * * * On March 15th, Ann Riley and Mary Riley were found insensible in hed, at 230 Livingston Street, Brooklyn, from suffocation by gas. * * * A serious explosion occurred March 17th, at 34 Appleton Street, Boston, Mass., caused by a leakage of gas. Two houses were almost completely wrecked. The heavy flagstones and stone steps in front of these houses were blown high into the air, and considerable damage was done to adjoining property. Mr. James N. Skinner, of Malden, was passing at the time and was thrown high in the air, falling with the debris into the cellar. Mr. Skinner was badly injured, and was removed to the hospital. Three other persons were seriously injured. The total damage to building and property was estimated at \$10,000. * * * On March 24th, an explosion of gas in a building occupied by the Poor Board, at Pittsburgh, Pa., partially demolished the building, and seriously injured two women named Mrs. McKee and Mrs. Archibald. * * * A fire occured while lighting the gas in the show window of a fancy goods store, 517 Greenwich Street, N. Y., March 26th. * * * John Welke, of 149 West Street, New York City, was found in his room March 27th, in an unconscious condition. The gas was turned on. * * * Two fires were caused March 20th, at 81 Fourth Street, and 48 Garden Place, Brooklyn, N. Y., by window curtains coming in contact with gas jets. * * *

EIGHTEENTH BULLETIN.

The Edison Electric Light Company,

May 31st, 1883.

(These bulletin, originally issued as a convenient way of answering the unquiries bolders, to give them information of the progress of the Company and of other actives of greater or less interest connected with electric Egiding. Agents are particularly requested to communicate to the President whethere practical points of greater interest may be developed by their experience in intalling or operating out of the progress of the Company and other active control active

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FIRST DISTRICT, NEW YORK CITY. This plant still runs with entire success. It has now hen jud permiss nikes Spenisher with entire success. It has now hen jud permiss nikes Spenisher 4th, without stopping one brand try or night. We are regularly gaining new formances, and commented the properties of t

HAVERLY'S THEATRE, OHIOAOO. This plant, mentioned in the Sixteenth Bulletin, is in successful operation. The plant consists of one Z and two K dynamos, 637 A lamps, the power being furnished by a 113/2 x 20 Armington and Sims engine. The lamps are distributed about the building as follows:

Gallery, Four 3-light brackets .				12	
Balcony, Two 6-light chandeliers				12	
" headlights				15	
" Ten 3-light brackets		-		30	
Parquet, Two 8-light chandeliess				16	
" headlights				20	
" Eight 3-light brackets -				24	
Boxes and Halls. Brackets				28	
Ladies' Room, One 2-light bracket				3	
Gentlemen's Room, One 2-light hra	icke	L		3	
Clouk Room, Bracket		-		1	
Dome. Crystal Corona -				74	
Foyer. Two 2-light brackets				4	
" Two 4 " newels -				8	
The state of the s					

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Lobby. One 4-light chandelier	4
Private office. 2 electroliers	3
Balcony, Lobby and Hallways, various fixtures	23
Upper Ticket Office and Room. Single brackets	2
Dressing Rooms, Halls, etc. Single brackets -	64
Foot Lights · · · · ·	50
Border Lights. 3 of 28 and 2 of 35	54
Ground Rooms. 4 of 10	40
Bunch Lights, 8 of 5	40
First Entrance	2 1
Engine Room	3
	_
Total Number of Lamps - 6	627

The Building was formerly lighted with a larger number of gas jets, but is now more brilliantly illuminated by the lesser number of Edison lamps. The calcium lights which have heretofore been a source of considerable expense and annoyance, are now used but little. All the varied stage effects are produced more satisfactorily than before with gas. The parquet and balcony headlights, mentioned above, are two rows of single lamps inserted in sockets protruding from the ceiling of the parquet circle and balcony, and ornamented with fancy shades, giving a brilliant effect. The crystal corona in the dome is an attractive feature of the installation, and commands admiration. The actors have expressed much satisfaction with the light, and state that it is a great relief from the gas formerly

TESTIMONIAL FROM B. H. WHITE & CC., BOSTON. The isolated plant in operation in the dry goods store of Messrs. R. H. t White & Co., Boston, Is giving entire satisfaction, and we have recently received from them the following testimonial;

5 "518 to 536 Washington Street.

BOSTON, May 14th, 1883. EDISON ELECTRIC LIGHT COMPANY.

GENTLEMEN-We have had some 750 of your incandescent lights in use three months and a half, and they have given us perfect satisfaction. In fact we should hardly know how to get along without them, and shall shortly double our plant to enable us to light our entire establishment. Very truly yours,

R. H. WHITE & CO."

STOCK EXCHANGE, NEW YORK CITY. We are now lighting the large room of the Stock Exchange from the Pearl Street Station. There are three electroliers of 66 lamps each, suspended from the ceiling at about two thirds of the distance from the floor, These fixtures are shaped somewhat like an open umbrella, though more flat, and the lamps in each one are arranged in two circles, one of 44 and the other of 22 lights. Each of these circles of lamps is on a separate circuit, and controlled by a separate switch, so that the amount of light used may be varied as necessary.

The following extract relating to this installation is taken from the New York Tribune, May 16th:

"After the close of business at the Stock Fachange yesterday the Edison electric lamps which have been placed in the Board room recently were lighted for the first time. The exhibition attracted many members of the Exchange, because it was understood that the use of electric lights in the whole building depended upon the success of the experiment. The room had been made dark by closing the heavy iron shutters of the doors and windows. The levers of the switch-loard were touched, and immediately the three clusters of lamps hanging from the ceiling glowed with lights. * * * E. A. Drake, chairman of the Committee of Arrangements, to whom the credit of making the change largely is due, was enthusiastic in his praise of the light.

BERGMANN & OC'S NEW CATALOGUE. Messra Bergmann & Co., have recently issued the fourth edition of their illustrated catalogue and price list of electroliers, brackets and other (121)

appliances, adapted to the use of the Edison incandescent light in huildings. It is a large pamphlet of 82 pages, fully illustrated, and contains descriptions and prices. Copies may be land on application to Mesars, Bergmann & Co., Avenue B and 17th Street.

THE ORAIG LIGHT. MISSTATEMENT CORRECTED.
The following letter, published in the Montreal Gazette, April 21st,

"TO THE EDITOR OF THE GAZETTE:

Six:-- On the 13th inst, the following statement appeared in the *Duily-Stat*, concerning 'The Craig Electric Light,' of which an exhibition habilities given the previous evening at the repair shops of the Grand Trunk Railway at Point St. Charles.

"The apparatus has been examined by the Chief Engineer of the Post Office Telegraphs of Great Britals, and a certificate given that it is the best yet invented; and Professor Morrior, Principal of the Stevens Institute, Holosker, although on the Advisory Board of Directori of the Brash Company, has certified that it is the only perfect system in the world."

Being interested in the development of electric lighting, I determined at once to forward the above statement to the gentlemen referred to, in order to ascertain its truthfulness or otherwise.

Mr. W. H. Preeze, engineer and electrician in chief of the postal telegraphs, London, England, cables me as follows:

'London, 19 April, 1883.

1 know nothing of Mr. Cralg or his dynamo, and have not given any certificate to any one."

While Professor Henry Morton, of Hoboken, New Jersey, telegraphs my assistant, Mr. H. M. Byllesby (who was one of the professor's pupils) as

1 Hoboker., 17 April, 1883.

No such statement as you repeat was over made by me,' The above disclaimers speak for themselves, and in the public interest I beg to ask the insertion of them in your journal.

Yours faithfully.

Thos. Swinvaria.

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CANADA. VALLEYFIELD FACTORY PLANT. We have received an order from the Montreal Cotton Company for a plant of two K and two L dynamos, 8co A lamps, to light their mills et Valleyfield, near Montreal.

AUPERIOR ECONOMY OF THE EDISON LAMP. Regarding the highly important economic feature of high resistance, in incandescent lamps, the Tweldth Fullectin continued a ynopole of the report of the sub-commission on incandescent lamps, National Esthibition of Electricity, Paris, 1833. That report set forth that there is "greater economy in high resistance lamps than in how resistance." Accordingly the resistance of the faur incanding the resistance of the faur incanding the resistance of the faur incanding the resistance. The result was as follows: the turns chair executed with the property of the property

	Edison,	Swan,	Lane-Fox,	Maxim,
Mean.	241	50	44	72

On this same subject of high resistance, the London Ellerician, May 5th, 1883, publishes the measurements of resistance of the same four incandsecent lamps, recently made by T. P. Barkas, and reported by lim, April 56th, 1883, to the Philosophical Society, Newceatle. M. Barkas' measurements, like those of the Paris commission, attest the superior economy of the Edison lamp. His measurements of the lamps made both ord and able, were as follows:

1	Edison,	Lanc-Fox,	ox, Maxim,	Swan,
Cold,	250	70	70	70
Hot.	125	28	3.5	30

STORAGE BATTERIES. AN EXPERT'S ADVERSE OFIN-ION. The London Electrician. May sh, centains a long account of a recent lecture by Mr. T. P. Barkas, before the Philosophical Society, at Newcastle. The following extract from the lecture relates to storage batteries:

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"Theoretically, secondary butteries appear to be very efficient-that is, they ought to store the electro-motive force put into them, but practically, from obstacles of various kinds, they do not. There are many practical difficulties in the details of working secondary batteries, and I have seen long rows of Faure batteries, sufficient, if in proper order, to light a theatre with 1000 lamps, unable to light a few lamps in a shop, because of some undiscoverable errors in their arrangement, or some unexplained or undiscovered local discharge.

NOMENOLATURE OF ELECTRICAL UNITS. In a recent lecture before the Chemical Society of Columbia College, Prof. Barker, of the University of Pennsylvania, gave the following concise definitions of the names of electrical units:

	ELECTR	ICAL UNITS.
NAME	UNIT OF	VALUE IN ABSOLUTE RECUTRO-NAGNETIC UNITS.
Coulomb	Quantity	10-1 or One tenth.
Volt	Electromotive Force	10' " One hundred million.
Olim	Resistance	10° " One thousand million.
Ampere	Current	10-1 " One tenth.
Farad	Capacity	to- " One thousand millionth.

Watt (amuere volt) Rate of Work to (or ten million) ergs. Horse-power .. " 746 x 101 (or 7460 million) ergs. loule Heat o. 238 water-gram-degree cent.

TESTIMONIAL FROM THE BIJOU THEATRE, BOSTON, The following testimonial has been received from Mr. E. H. Hastings, General Manager, Bijon Theatre, Boston:

"BIJOU THEATRE, Boston, May 18, 1883. SPENCER BORDEN, ESQ.,

Manager New England Department, EDISON ELECTRIC LIGHT Co.

DEAR SIR:—We desire to express to you our complete satisfaction with the electric lights furnished by you to this Theatre in December last. The system Assis.

in all its operations has proven familiess, and most admirably adapted for our purposes, and, as it has been in constant use for nearly six months, never requiring alteration or repairs, Mr. Edison and your Company are certainly to be warmly congratulated on the absolute success attained Very truly,

BIJOU THEATRE CO., By EDW. H. HASTINGS."

BATESVILLE, VA. INDUSTRIAL SCHOOL PLANT. We have received an order for a plant of one K dynamo and 250 A lamps, to be installed in the Miller Industrial School, Batesville, Va.

TESTIMONIAL FROM AMORY MILLS. We have just received the following testimonial from the Amory Manufacturing Company, Manchester, N. H., regarding the Edison plant installed in the Amory Mill.

" EDISON ELECTRIC LIGHT COMPANY,

GENTLEMEN:-In reply to your favor of May 15th we would say, that last fall we displaced 500 4-feet burners with 250 of the Edison incandes ent lights 16 C. P. each. That we pay \$1.60 for gas and comparing the cost of your light with the 500 lurrers displaced, we find that in 6 member's time we have effected a saving of \$1,021.60. With this showing we are obliged to codorse it.

> Yours truly, G. P. WHIMAS, Agent."

THE "POST" ON STORAGE BATTERIES. The following article on stomge batteries is taken from the New York Evening Post, May 1st:

"During the sast few weeks it has been rangored that the storage batteries, of which so much has been written of late, and a form of which the Brush Electric Light Company are preparing, according to the officers of the com-pany, to put in for lighting New York buildings, are not quite what was hoped. Some specimen batteries, manufactured by the Faure Storage Battery Company, of Belgium, were sent over to this country by the Labrador about a year ago, since when little has been dose to put the system into The original American Force and Light Company, holding

patents from the Heights Faure Company, location entangled in a number of usis with the parent company which are not yet eithel. In the useantime the original American Company and I regists covering the whole of the United States to four unitercoparies. ** I sate anatument the sub-company holding the rights for rallenal-car accumulators put some latterles upon the cars of the Fennyylman Kalmond, in utterly have since been taken off, owas, caccording to the officers of the company, to the highestic in which the patent rights were involved.

Among ome scientife mes we have tassfed the nature attentively, the torage leading is safely and are negatively as required to an expective try, containing perhaps the grow of a gent ideovery, but as yet sufe for practical work. The trustle with it, that the contract of the contract of

There mustle ago. A New York patient layers was sent to Fampo to actualise the Sellow-Volkskara sarraged burger in beliaf of some American capitalises shot family to diversion; movey in the company which also higher capitalises shot family to diversion; movey in the company which also higher and was called upon 12 a reporter of the Armonic Plant, to whom he tall the following every. He investigated the whole subject of stratege bursters in Insuinces point of view, and consolid aftering Plant in the whom he tall the find plant in the part of the part of

The Forming Part constained a few days ago an account of the preparation smalling by the Henth Bisteric dayle Cumpany of this day to large the parties and the part of the parties and several loodness brailings with Hends secondary hatteries and Swara haups. The Faure Company are most gentler Henth Company for infringement of patents, and counter suits by Hends to arrecting the after the of Faure Parties and Swara has the parties and the parti

To som up the matter, nothing practical has yet been done with the latteries, although they have been here for a year, and Protesser Barker. Edition, and Skephen 17. Pilid, who have all given considerable study to the matter, do not yet consider the storage lattery a practical all to the use of electricity, while doublitting that its possibilities are great.

Water by Lynnin

SUNDANY, P.A. A ORNTRAL STATION. The Edition Electric Illuminating Company of Sumbary, Pa., has completed its organization, procured its capital, and given us an order to at once install a central station plant, details of which will be given in the next Belletin. A large portion of the scok of the Company was subscribed for by parties at process using gas but who propose to become consoners of the Edition Company.

The officers of the Company are as follows: Frank H. McCormick, President: Thomas C. Detwiler, Treasurer; James W. Sweely, Secretary; Frank H. McCormick, Thomas C. Detwiler, James W. Sweely, Charles B. Story, Seth T. McCormick, Directors.

SHAMOKIN, PA. A ORNTHAL STATION. The Editor Relectic Hluminating Company of Shamokin, Pa., has ordered us to install a central station plant of 1, 6co lights, work on which has been aftensity commenced. Details of the plant will be given in a future runther of the Bulletin. A large part of the capital stock of the Company was subscribed for by consumers of gas who propose to shambon east and use the Edibon History.

The officers of the company are as follows: W. H. Domy, President; Holden Chester, Vice President; John Mullen, Treasmer; S. William Beary, Secretary; W. H. Domy, C. C. Leader, John Mullen, A. Robertson, Holden Chester, William Benry, P. B. Slaw, Directors

MEAGURING ELECTRIC LIGHT AND GAS. The London Town, April 7th, consined a letter from Mr. E. H. Jehnsen on the question of "What method of charge will best develope, and issure to the users of the electric light, the bessits of economic improvements". The Ghowing extract from the letter relating especially to the Edition system of measuring the Edison Electric Light, is of concent listerers.

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CONTRACTS CLOSED BY THE WESTERN EDISON LIGHT COMPANY. Since the last Bulletin the following plants have been sold by the Western Edison Company:

- (t). A plant of one K dynamo and 28t lamps to light the residence of Mr. M. D. Wells, at Chicago, Ill.
- (2). A plant of one K dynamo and 230 lights to be used in the First National Bank and Safe Deposit Yaults, where they will displace the Weston are lights and the Maxim incandescent lights which have heretofore been in use and now abandoned.

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THE BOSTON "JOURNAL" ON STORAGE BATTERIES.
The following extract from the Boston fournat. April 30th, quite fairly
states the present views of the best informed portion of the public
about storage batteries:

"Almost simultaneously with the report, which I mentioned a day or two age, that the Brisis Electric Light Company were really getting ready to put in their storage latteries, and illuminate New York with Swan incandescent lamps, come equally well authenticated reports to the effect that the value of the storage battery has been greatly exaggerated, and that it is yet nothing more than a laboratory toy of no practical value whatever. I met yesterday a lawyer and patent expert who was sent to Europe this winter on behalf of a number of gentlemen who thought of investing in the stock of the New York company which holds the Faure patents, supposed to be the only valid ones upon storage leateries, Brush to the contrary notwithstanding. This gentleuses went to London to find out what had been done over there with it in a practical way, and has just returned. He saw Sienens, the forenost English authority upon the subject; Lockyer, who is among the best English electricians; Procee, who is at the head of British telegraph lines, and besides those scientific men of acknowledged position, he advertised for information regarding storage lutteries and questioned all practical men who had had anything to do with the matter. The result was to convince him that it would be movise to risk money in the storage hattery business. At his request backyer went to Scotland to find out what Sir William Thomson's experience had been, for Sir William was among the first to give reputation to the storage buttery. The story which the great investigator tells is not encounaging to investors in new scientific schemes. He has given more than a year to the study of the storage battery, and confesses that in its present condition it is nodes as an remonical apparatus. The trouble is that the lutteries runner be recharged more than four or five times; the lead plates disintegrate and fall to pieces after that and have to be renewed. The first result of experiments with storage batteries is to fill the experimenters with enthusiasm; then they find that there is a radical fault in the machine, but so fascinating is the affair that they say little about the snag they have struck and work away hoping to find the remedy. For instance, out of the hundreds of latteries which Sir William Thomson has constructed within the last year and a half, three seem to stand any amount of recharging and discharging; the lead plates in these three temain intact, while all others have gone to pieces long ago. * * * Stemens talks in about the same vein and acknowledges that the selectific world jumped at conclusions too hurriedly. Preece and Lockyer agree with these upini and the New York expert came back, and presented a report which has stopped all negotiations for stock in the New York Faure Company

These views received corruboration to-day. I met Prof. Barker of the University of Pennsylvania, one of the best electricians in the country, and

There is, he said, the germ of a grand discovery in it, but no one days at n by 1. The place given any not none developing has no ley ut his der louting in proportion to what you can get out of a fit to make it exceeds the same purposes, when each of a fit is important, at may be used, but as no required to examine the Homa hostery by one case who, any off. I wan required so texamine the Homa hostery by one case who, any off, I wan required to examine the Homa hostery by one case who, and it is not to be the story about the fit of the lends Company and asked to see the lattery about which so much had because it as a pointry reloaded whether II black on the preparation of the place they are in the story about the contract of the contract of

Stephen O. Flekl, a practical intervision of earthern reprises, who has been seen seed work for the Western Unitos Company, and amplies of Cyrns and Imality Flekl, in rather more composent than Front. Harter. "The wides and the study," than a steady to make more mooney. The thread lighting many the study, "and a steady to make more mooney. The thread lighting many and the study of the parent company says in them: Here is the stonge hastery, which company says in them: Here is the stonge hastery, which company many more part in a special special special steady of the stoney is a steady of the state of the stoney of the state of the sta

Prof. Morton, of the Stevens Institute, in Holoken, has been lecturing within the hat week upon the beauties of the battery, but his enthusiasm is probably due to finesperience, for he has been experimenting with the Schlon-Vockmar battery, the same form which Stemens gave up."

WESTERN UNION TELEGRAPH SUILDING. A statement was made in the isa Bulletin that the Western Union Telegraph Company's building. New York City, was to be lighted for made Paral Street Station. At that times written content to them took lad Jeen made between the Western Union Company and the Edition Company, but since the, by mustal consent, the counter has been abrogated, and the Western Union Ruisling, centally for the present, will not be lighted by our Common? .,

THE CZAR'S CORONATION. EDISON LIGHT. A cable from Moscow to the New York Herall, states that at the curonation of the Czar, 3,500 Edison lights illuminated the tower of Ivan the Great.

TESTIMONIAL FROM MESSRS. FISS, BANES, ERBEN &CO., The following testimonial which we lawe received from Messrs. Fiss, Banes, Erben & Co., who have an Edison plant of 500 A lamps in their Worsted Mills at Philadelphia, will be of interest:

" Fairmount Worsted Mills; Office, 106 Closing St., Fiss, Itanes, Erden & Co.

PHILADELPHIA, May 19th, 1883.
Mr. John Hoskin, Agent,

EDISON CO. FOR ISOLATED LIGHTING,

Room 6, Ledger Building, Philatelphia.

DEAR SIR:—In response to your request for statement of cost of electric lighting at our Mill by the Edison Incambescent System, we submit the following:

Number of hours plant lighted since installation of first

Costing 3.399 (Rib. x \$1.90. \$0.459.41
Actual cost of gas used in addition to Electric light. 1,391.56
" value of cas light amplianted by electricity. 51.067.86

" value of gas light supplanted by electricity...... \$5,067.85

Our expenses for the electric light to supplant this have been as follows, viz:

(333)

(114)

Total cost and Make	
Total cost gas light supplanted	
there again	
Net saving	\$3,010.07

Comparative cost of gas light to the electric nearly as 5 to 1.

Trusting you will find our method of calculation a reasonably practical one, we are,

Yours truly,

FIRS, BANKS, ERBEN & CO."

We think that two additional items require mention, to make this letter complete, namely, the expense of an engineer and an allowance for depreciation. Regarding the first, the engineer, Messrs, Fiss, Banes, Erhen & Co. make no charge for his services because the regular engineer who attends to the running of the mill engine, looks out for the dynamo, no additional help being employed. As regards the other item, depreciation on the electric plant, we think some charge should be made. The total cost of the plant was \$12,006.40, including an independent engine. A very large part of this amount, however, covers wiring, fixtures, etc., which do not depreciate appreciably, leaving only the active parts of the plant upon which the expense of depreciation should fall. A fair allowance for depreciation is three per cent, per annum on the total cost of the plant, although the appreciable depreciation is on only the dynamo and engine. Allowing for depreciation on that basis, it would amount, during the period of four months referred to in the above letter, to \$120.07. Deducting this amount from the saving as compared with gas, above given, there still remains a net saving by the use of the Edison incandescent light of \$3,815,90.

UTIOA "HERALD" LIGHTED. An Edison plant, one Z dynamo, has just been installed in the Morning Merald, Utica. The following is from the Herald, May 18th:

" in the Herald office there are one six-light electrolier, several portable lights, and about 60 bracket lights.

(13%)

17

The Herald buildings have up to the present time been lightled principally by kerseen hamps with urgand homes, the gas is used in the counting room and some of the editorial rooms. These numbered in all 58 [tabs, which were nearly all kept hoursing all night. They are to be replaced by 64 electric lumps which give a far better fight. In other establishments the reduction in the number of lumps would be much greater. The following table shows the reduction in the number of highs in each department;

	Elec osm	tric pr.	Oil lambs
Press room	4	replace	,
Editorial rooms	. 10		17
Counting room	. 4	**	7
Composing room	. 40		43
Folding room		**	4
Halls.	2		3
Total	. 64	replacin	g 83

When two persons waterds in one room, is the oblivable legaminary, between the purpose was proposed to the problem, but the problem to the proposed to the problem to the pro

The same issue of the *Herald* contains the following little tribute to Mr. Edison, which persons with long memories will appreciate:

"—The Edison light 'corners' the diamond match. No match, no flicker, no snoke, no heat—plenty of light. Edison was thing a powerful lot of thinking while 'ns fellows' were pointing paragraphs at his delays."

RUNTER'S POINT, L. I. PLANT FOR CHEMICAL WORKS, We are installing a plant of one Z dynano with A lungs, at the Warren Chemical Works, Hunter's Point, Long Island. The light is to be used in rowns pervaded by wolatic gases, highly inllamnable.

(3)

STRASBOURG, LIFE OF LAMPS IN RAILWAY STATION.
PLANT ENLARGED. An Edison plant was installed over a year
ago in the milroad depot at Strasbourg. A letter recently received by
Mr. Edison speaks as follows ghout it:

"The machine No. 32, which was placed in the Station lever, has worked every night from that's until Applich since January big. 1852, or over 500 hours. Of the first too lamps there is mes still humba, and it has learned for 5,000 hours. The records has been accurately kept by the railroad disco, and the average life of the first 100 lamps has, so far, exceeded 830 hours. The lamps have always been kept as 16 cantles by measure."

The best evidence of the satisfaction given by this small plant is the fact that it has been increased from a Z dynamo and about 100 lamps, to a number of large dynamos and 1,200 lamps.

TESTIMONIAL FROM THE DAVENPORT "GAZETTE."
The following testimonial is from the Gazdu, Davenport, Iowa, May 11th. The proprietors own an Edison plant with which they light their own building, and sell hight to their neighbors:

"More than five months ago the first F-dison electric light plant used in lows was set in operation in The Gasette premises. On the night of last Thanksgiving Day the first rays from an Edison electric lamp seen in this State illuminated the editorial, composing and press rooms of The Gazette, and the rooms of the Post-office in Davenport. Subsequently, the Ackley House, the wholesale tolsacco warehouse of Nicholas Kulmen, the wholesal and retail clothing store of Robert Krause, and the hat and cap store of W. S. Cameron & Sons were successively supplied with the same illomination, direct from the plant placed in use by The Gazette. Continuously since have these several establishments been lighted exclusively by the Edison electric light, and only to the increasing satisfaction of all who have used it or have had opportunity to observe its power and its effect. As to results secured in the editorial, business and press rooms of The Gazette, we are certainly prepared to speak understandingly, and with absolute confidence. With The Gazette the Edison light long since passed beyond the realm of experiment. The test of nearly half a year is as complete, concerning all that pertain to the quality and satisfactury use of the light, as complete as though it had been in use a sense of years. That test has proven the light to be perfect, in the fullest sense of that word. Nu light ever used in this office has been so grateful to the eye, so soothing to mind, and so contributary to case in night labor. Personal experience enables us to testify of Impared vision strength19

of actual angular proposition and the control of th

encel, and irritated eyes relieved of long normers, under the rays of Edison's grand beneficence to tolkers in the night wratches. Sladlarly it is the concurrent testimony of composition that they can average then per cent, more work nightly by the use of the Edison light, than in that of any other illuminator by them ever tried. And what it said by The Edisorita in these directions simply were the opinion of all who have used the Edison light in their respective exhabilithments in Dyacomoto.

FORD'S OPERA HOUSE LIGHTED, BALFIMORE. We are installing a plant of one H machine and 350 A lamps in Ford's Opera House, Baltimore, Md.

TESTIMONIAL FROM PHILADELPHIA. OHEAPNESS OF OUR LIGHT. To following estimonial is from Messrs, John R Steton & Cu. Manufacturers of Wooden Hast, Philadelphia. Their statement about the cheapness of the light, as compared with gas, shows that their experience in this regard is similar to that of many others of our customers:

"PIREADELPHIA, May 2d, 1883.

Mr. JOHN HOSKIN, Aprel.

EDBON COMPANY FOR ISOLATED LEGIFING.

Data Six—in reply to pour repent, we gar you con full permission refer to us on the replicate face. Since carter [ask, and one on eithered to consider [ask, and one one eithered two consenses by using a field (playman, and shorty fair about a second two consenses by using a field (playman, and shorty fair about a second to consense a second to

Very respectfully yours,

Joun B. Streson & Cu."

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PROF. BARKER ON STORAGE BATTERIES. 'The following extract, from a paper by Prof. Barker, on storage batteries, briefly states his conclusions on the question of storing electricity:

"The commercial aspect of the question of the storage of electrical energy has recently assumed a very considerable importance. But it is evident at the outset, that an agent, which has been produced, and then stored, must cost more when redelivered than when first produced, by exactly the cost of the storage; that is, supposing there is no loss in storing. But there is a loss, and this is almost if not quite one half of the energy havolved, as it would seem from the Conservatoire experiments in Paris, among others. The first cost of the accumulators, the expense of charging them, their low efficiency, and especially their bulk and weight, most ever prevent, it would seem, their competing successfully with the direct use of the dynamo-electric machine, at least with any form of secondary leattery yet devised. For special uses, however, the storage hattery has a high value. Even if the cost of an ampere of current produced by it is twice as great as if produced directly by the dynamo machine, this cost is only one-half of that required to give the same current by any available form of primary battery. Where a strong current of low electro motive force is needed, under conditions where a dynamo cannot be employed, there the secondary leattery has its most important field. Its value rapidly decreases as the number of cells is multiplied, as when a high electro-motive force is needed for the production of light. Its chief advantage its transportability; since by placing it near the work to be done, the loss

energy on long conductors is obviated."

BALTIMORE "SUN" PLANT. The following extract from a recent number of the Baltimore Sun, shows how the proprietors continue to regard our light;

"The Sout' new dynamo stateline, resighing sently for tons, has just on section. In continual and Dislavis' has the improvement, and sell give necessity. In continual and Dislavis' has the improvement, and sell give necessary to the self-section of the section of the section

71

ORANGE, NEW JERSEY. RESIDENCE WIRED. We are wiring the residence of Mr. Henry Auchineloss at Orange, New Jersey, for about 85 Edison lights.

NEW YORK "SUN" LIGHTED. We are now lighting the composing room of the New York Sun with q8 lamps, the current for which is supplied from the Pearl Street Staton.

STEAMMIP LIGHTING. ANOTHER PLANT ORDERED, whe take the following from the Loudon Educiara of May 11th: "The Union Steamship Company of New Zealand lave entrusted the lighting of their new mail steamer the "Takapana", now finishing at Burrow, to the Edition Electric Light Company. When completed, this will form the third vessel of this line which has been lighted on the Edition Steat "S.".

GUION LINE STEAMER TO BE LIGHTED. The London Edison Company is installing a plant of 500 A lamps on the Guion line Netennship "Oregon," now building at Glasgow for service between Liverpool and New York.

1569

EDIAON'S GANADIAN PATENTS. The Sixth and Fourteenth intellection contained itealied line of Mr. Elison's United States patents and applications for patents on electric lighting by incanalescence. At the late of the Fourteenth Bulletin, the total number of greatest issued by the United States Patent Office to Mr. Edition on this subject was 149, benides applications for 135 additional patents then pending. Up to this date the cost number of patents issued is 37, and the number of pending applications has been increased by further inventions of Mr. Edition to 167. The most important of these inventions have been patented also in other countries, including Canadia.

The Canalian patent practice formerly allowed more than one invention to be embraced in a single patent, being in that respect different foot patent practice of the United States. Accordingly, the number of Mr. Ellison's patents in Canada is usued best than in the United States. Up to the present time there have been issued to Mr. Ellison thirty-seven Canalian patents on electric lighting, and unray additional applications for patents are still premising. The following is a list of the Canadian patents afterally issued to him and assigned by Jim to the Follow Beeter, Eight Company.

TITLE,		DATE.	Numer
 Method of and Means for Developing Electric Currents, and Lighting by Electricity. 	May	28, 1879	10,031
2.—Electric Lamps and Methods of Manufact- uring the Same	Nov.	17, 1879	10,654
3.—Electric Lamps and Methods of Manofact. uring the Same	Jan.	10, 1880	10,791
4 Electric Lamps and Methods of Manufact- uring the Same.	July	19, 1880	11,520
 The Diffication of Electricity for Light, Heat, and Pauer, being an Improved System and Means for the Generation, Regulation, Distribution, Measurement and Temphatic. 	July	21, 1880	11,527
of Electricity into Light, Heat and Power.			1

to a complete about					/ W.
TITLE.		Date	τ.		NUMBER
6.—Dynamo ur Magneto-Electric Machines and Electric Motors	Ort.	9.	1880		11,857
 Electric Lamps and Carbon or Incambescing Conductors therefor, and Means for and Methods of Manofacturing the same 	Nov.	11,	1880		11,968
 Systems of Conductors for the Distribution of Electricity as a Lighting and Motive Power Agent, and appliances connected therewith. 	Nov.	15,	1880		11,997
 Means for Measuring the Amount of Electrical Current flowing through a Circuit 	No.	20,	1880		12,049
10.—Magneto or Dynamo-Electric Machines, ap- plicable to both Generators and Engines	Ma.	31.	(88)		12,567
 Weberneters, or Devices for Measuring and Registering the Current flowing through Conductors. 	June	go,	1881		13.044
12. System of Electric Lighting, Electric Lamp- and constituent parts thereof, and Means and Methods of Manufacture connected therewith	July	5.	1881		13,037
13. Devices for Measuring the Electric Current passing through or used upon a certain Conductor	Aug	1.	1881		13,408
14.—Electric Arc Lights	Auc	20.	1881		13,515
 Communictors for Dynamo or Magneto Efre- tric Machines or Electro Motors 	Selec	23.	1881		13,467
16Dynamo or Magneto-Electric Machines	Sin.	10,	1881		13.734
17. Magneto or Dynamo-Electric Machines or Electric Engines	Non.	291,	1881		13.753
18Electric Lamps and the Manufacture thereof.	Da.	14.	1881		13,844
19 Dynamic or Magneto-Electric Machines	Dec.	14.	1881		13,836
20Systems of Electric Lighting	Dec.	21.	1881		13,875
at The Manufactore of Carbon Combuctors for Incandescent Electric Lamps	Dec.	26,	1881		13,886
22Meters for Measuring Electric Currents	Dec	26,	1881	1	13,900
23 Electric Chandeliers	Det.	17.	:582		15,642
24 Fittings and Fixtures for Electric Lamps	Oct	19,	1852		15,646
25. Fixtures and Attachments for Electric Lamp-	Oct.	20,	1882		15,654

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TITLE.	Dare.	Numer
26.—Electric Lights and Fittings and Fictures therefor	Oct. 25, 1882	15,693
5. Bectra-Magnetic Motors. 50. Underground Conductors. 10. Underground Conductors. 11. Electrical Distribution Systems. 12. Current Regulators for Dynamo-Electric Machines.	Nov. 21, 1882 Nov. 21, 1882 Nov. 22, 1882 Nov. 22, 1882 Nov. 22, 1882 Nov. 23, 1882	15,816 15,822 15,830 15,831 15,832 15,843
33.—Electric Lamps	Nov. 23, 1882	15,844
35 Regulators for Magneto or Dyname, Florage	Nov. 23, 1882	15,845
36. Regulator or Dynamo or Magueto Electric Machines and Electro-Motors	Nov. 23, 1882 Nov. 23, 1882	15,846
37 Regulators for Magneto or Dynamo-Electric Machines.	Nov. 23, 1882	15,848

TESTIMONIAL FROM F. SHAW & BROS. We have received the following testimonial from F. Shaw & Bros., manufactarers of sole leather -

" KISOMAN, Mr., May 24th, 1883.

PHE EDNOS CO. FOR ISOLATED LIGHTING. SPENCER BORDLY, MANAGER NEW ENGLAND DE'PT.

DEAR SIRT - Since changing from the 120-light machine (8 camble-power) DEAG CIRC County to the Go light matchine (16 cambe power), we will say that we are more than pleased with the light. We have been running the lights constantly throughout each night for several months, and up to this time have had little or no trouble, the lights burning steadily without my fleckering and very brilliant.

The cost of running your lights compared with any other artificial light is in our opinion a great saving, and to us, thus far, the cost has been very small susside of power (which is surplus), merely the oil and attention of one man, the machine sometimes running whole nights without being touched,

We remain, Yours respectfully,

F. SHAW & BROS."

ANOTHER PLANT INCREASED. The Old Kentucky Woolen Mills (Messrs, L. Richardson & Co.), Louisville, Ky., have ordered their plant heretofore installed, which was one K dynamo, 250 A lights, to be at once increased to one II dynamo, 350 A lights,

OOST OF THE EDISON LIGHT COMPARED WITH ARC LIGHTS AND GAS. Mr. Sidney B. Paine, Assistant Manager of the New England Department of the Edison Company at Boston, has recently prepared a valuable paper on the cost of the Edison system of incandescent lighting, compared with are lights and gas in factories. His paper, printed in the Cotton, Wood and Iron, Boston, April 14th, is copied below:

"We publish below, as nearly as we can a-certain it, the absolute facts of the cost as between the are and incamlescent systems of lighting. We believe it will be of interest to manufacturers, and it will be seen that the data given is intended to be from the stand-point of absolute accounts which have been verified by manufacturing concerns

This estimate is based upon the requirements of a weave shop containing 1,000 forty inch booms manufacturing white shirtings. To light this room properly will require 40 arc lumps (one lump to twenty four bones), or 250 Edison to candle-power incande-cent lamps (one lamp to four Fours). This distribution of the light is the one which has been found, in actual practice, to give round results.

The estimate on the musting expenses of the arc system is based upon a statement made by Col. Thomas Livermore, before the New England Cotton Manufacturers' Association, in October, 1882. This centleman is using a fu are lights (about half being Brush, and one half Weston) in the Amoskrap Mills, in Manchester, and has kept very accurate accounts of the expenditure entailed by these systems. The estimate upon the running expenses of the Edison system is also based upon actual practice. From this experience the Edison Company has made full guarantees, thus protecting the manufacturer. As the Edison Company has protected itself in making these guarantees, the manufacturer will realize better results than those given below. These latter expenses are therefore the maximum.

PORTY-TWO ARC LANCE.

This plant, as installed by the Brush Company, will cost \$7,000, including waring. The power-required will be 42 horse-power, which at 1,8% cents per horse-power per hour (\$50 per horse-power per year), will cost 70 cents

CONTRACTOR OF THE PROPERTY OF

The "labor, carbons, and repairs," at 2 150 cents per lamp per hour, will cost \$1.21 per hour.

The "depreciation," as estimated by Col. Livermore, amounts to 15 cents per hour per hamp, equal to eight cents per hour on plant in question.

cents per hour per hamp, equal to eight cents per hour on plant in question, two numbers and first rough incandescent lames.

This plent, as installed by the Edison Company, will cost about \$4,000, including wiring. The "power" required will not exceed 35 horse power, which at 1 100 cents per horse power per hour will cost 58 cents per hour. The "lamps and Irushes," estimating that the Edison Company is called upon to make good its guarantees of an average life of 600 hours for the imps (renewal 51 each) and of 200 hours for the brushes (510 per set) will cost 47 cents per hour. The "depreciation" of the Edison system assuming that the Edison Company is required to make good its guarantee of 1500 hours life for the "commutator" (renewal \$50) will amount to three (3) cents per hour. There is no cost for "labor" connected with the Edison system, other than that included in the charge of 1.5% cents per borse-power per hour, incomed as the dynamo can be placed in the engine room, and the engineer can pay it all the necessary attention without interfering with his This charge (1,67, cents per horse-power per hour) is extremely high. It owers all labor of engineer and fireman, fuel, water, oil, waste, and all depreciation, interest, taxes, and insurance on steam plant, consisting of engine, foundations, heater, boilers, stack, engine and boiler house. These charges, in an ordinary equipment, ought to be covered by 540 per horse power. While this basis may answer for the purposes of the present comparison (as both systems are brought to the same basis), it is evidetaily improper to adopt it, in comparing either of the above systems with any other, unless such other be first brought to the same level.

Tabulating the comparative estimates given above, we have the following running expenses (exclusive of interest) for lighting the above room for one hour:

L	42 Arc mps, \$7,000.	250 Edison Lamps, \$4,000
Power	\$0.70	\$0.58
Labor, carbous, lamps, repairs	. 1.21	-47
Depreciation	08	.03
Hourly expense, exclusive of interest	\$1.99	\$1.08

To light the above room with gas would require 500 4-foot burners. The piping for the above number of burners would cost, at the lowest estimate, \$1,500. These burners would costsine 2,000 feet per hour, which, at \$1,60 per thousand, will cost \$1,500 per hours. We like of \$1,500 per hours.

If, instead of steam power, as figured above, water power is used, the cost will be very materially reduced. In Lawiston, water power sells for \$5 per

horse-power per amount interest on the plant and labor will not exceed \$5 per horse-power, bringing the outside cost per year to \$60 per horse-power. On this basis, the power, necessary 5 persisten the are lights in slower example, will cost 14 cents per hour, and to produce the 250 Edison lights, 12 cents per

The following table gives a view of the comparative hourly expense, including lateracy of fighting the above roas by the three systems, the 'lighting time,' or time during which lightly required, a soumed to compare year, in color up to a year of year of the coloring produced in the contract produced accuratingly. Appended to this table are four the lously expense herekoned accuratingly. Appended to this table are four coloring solutions above the saving produced as a percentage, our the first contraction of the Eddenn panaly detained by the use of the Eddenn uncandescent light over are lightly our save lightly our save lightly our save lightly and gest.

			ZIETN	PORTE.			STEE	MART		211	lvi B	Des	ia.
turing Ties.	Cas at \$1,60.	Ire.	Lines	Lyin.	of Gas.	In.		Equit.	of Gas.	Ste	ın.	T.	Set.
				Arr.	Lisa.			lu.	Elpa.	Inc.	Gas	Jac.	fu.
310	\$3.50	163 22	\$1.61	\$1.55	10.86	\$483	\$1.40	\$1.18	\$0.65	11%		10.5	150
4.0	1.16	304	1.68	1.41	.:5	* 45	4.72	114	- 57	14%	150	11.	33,
5***	1.13	2.85	a of	1.34	.74	2 24	1.10	116	50	160.	23%	14%	29
	1.44	260	1:45	1.08	-71	2.10	1.02	8.00	16	18%	17.		3.5
7500	1.11	250	. 1-41	1.24	15	4,541	.1	- 12	- 46	25	31".	15%	40'
5.0	2.21		1 116		.67	6.93	12	53	- 44	25%	31.	7 %	424
	1 22	2-41	1.11	1.17	44	1.81	.34	-17		27%	100	24%	61.
1,250	3-27	2-33	1.27	1.11	.61	1.74	-24	.35	-59	3300	63'.	mr.	::
.5**	1 16	2.27	1.24	1.11	.61	6.64	.25	.63	32	33		34%	03
tone.	2.95	2.00	1.21	1.08	.60	1.61	-74	100	.36			45%	
ac	121	*1)	20.05	1,05	-57	1.56	120	-:0	-35	71%	155%	61.	190

The columnal abundancy however, we all with the cloric legion. The pale healts the rows and whitake their in. In the cosm in specials in fided up the moisture from the space pale, as not which a perticuls were will readily upon benefit and in the contraction of the contraction contraction in the contraction of the contraction contraction of the contraction contraction in the contraction of the contraction of contraction of the contraction of contraction of the contraction of the contraction of contraction of the contraction of contraction of the contraction of the contraction of con

(141)

the twenty which continue to run, as each Edison lamp may be turned off, entirely independent of the others, and one-seventh of the power will be saved. Again, on "dark days" it is necessary to light the centre of the room before the sides. The arc large named alove being "ie series" on one circuit, must be switched off each in turn, and then, with no saving in power, as it is impossible to shut off more than three-tenths of the lamps on those circuits without throwing in an equivalent resistance either by other lamps or resistance coils. On the other hand, the Edison lamps are arranged in several distinct circuits, each of which rases the length of the room, and parallel to the others. By switches the entire line may be shut off at once, with a resulting economy in power. An automatic regulator is provided which, as lamps are turned off in the rooms, inverts resistance in the magnet virguit (not in the direct circuit or the circuit in which the lamps are placed with the arc lights), thus allowing less current to pass around the magnets. These magnets, therefore, become weaker, and less power is required to turn the armatine. The Edison is the only electric light company using an automatic regulator, whereby an absolutely steady, and musurm light is maintained irrespective of both the load and speed of the armatine within reasonable limits; that is, it cannot produce light when the dynamo is at rest, nor entirely adjust should that speed be doubled. The former case is not expected, and the latter never occurs in practice. The fires, stated in the daily papers as being produced from the electric light," leave been due to the arc light; no insurance company has ever been called upon to pay a cont on account of damage by the Edison system. The reason is obvious. Edison uses an automatic safety device, which is absolute in its action. It acts on the same idea as the automatic sprinkler, and is even more sure. Only the one, or at most three lights, on the tap" would be eatinguished in case of an accident, as each tap is protected by its own safety-catch. The use of such an arrangement on an arc light circuit is theoretically possible, but it is otterly hapracticable. The arc lights are, so to speak, strong along one wire, the current for the second passing through the first; any break in this circuit will instantly extinguish every one of the lights on the muchine; a most serious objection, as a punic would inevitably cusue among the operatives. Again, break-downs on the looms usually occur below the lathe, and as the dense shadows cast by the are land render repairs by its aid out of the question, oil lamps must be used to the great discomfort and disadvantage of the mechanics. Edison has a lantern which may be attached by means of a tlexible cord to the socket over the loom or other machine. This lantern may thus be carried about within a radius of the length of the flexible cord. The lantern may be carried to any part of the room, and there made available about any machine by detaching it from one socket, and attaching it to prother

The current produced by the Edison dynamos is perfectly harmless, it The current postuced by the purson symmetry purson the pursuage through the being hupossible to produce inpury to the person by its passage through the

body. An ordinarily close reader of the daily papers connect fail to have been struck with the number of accidents resulting from the use of the arc light or

Thus, for cheaptiess in first cost, economy in running expenses, and general efficiency and desirability, as well as safety to the person and property, the advantage seems to be entirely on the side of the Edison system, as compared with the are system or gas. Its superiority to either of the other systems is not confined to the illinoination of weave slope; an equal advantage will be found in either the spinning, speoling, carding, or other departments of a cutton, wealen or worsted mill.

In machine shops, or other places where special light is required, the Edison system stands without a rival.

Mr. Elison has a larger machine which will produce a cheaper light even than the dynamo in the above example. This larger dynamo will produce and maintain current sufficient for 323 to 330 lauge of th candle power each. The installation of this machine, together with all necessary material, will cost in the neighborhood of \$5,500 or about \$15,72 per lamp, against \$16 per hamp for installation of dynamos in above example

TESTIMONIAL FROM BOSTON CHAIR COMPANY. We have received the following testimonial from the Boston Chair Manu-

facturing Company, 86 Washington Street, Boston, Mass.;

surviva Barney For

Boston Mass DRAK SIRE-Your favor of 15th inst., asking for denals of cost of rouni our Edison System of lighting and figures compared with other methods of lighting has been received. We commenced using the light late last winter, and continued to use it only till about 1st of April. We used one hundred and fifty lights, an average of one hour a day, for about one hundred days: and on account of the possible danger from fire in other methods of lighting we have never used any artificial light at all before introducing your system. We therefore cannot give you any figures of comparison. In regard to cost of running, it was almost inappreciable, our feel being of no market value, our engineer and foremen being employed by the day of ten hours, and the light being required at the last hour of the day when muchinery and shafting were well oiled, buildings warm, etc. We have not figured any cost except the services of one man at \$2.50 per day, taken from his other duties one hour per day. While we used the lights the whole plant gave perfect satisfaction; no lamps gave out, none were broken except by our own carelessness during the day, nothing whatever went wrong.

Respectfully, L. H. Arosso, Sout."

STEAMSHIP LIGHTING. ANOTHER PLANT STARTED.
The plant of 65 A lamps installed by the Ridison Company of London
on the "Rio Pardo," a steamship built for the Brazilian coasting
trade, has been successfully put in operation. The vessel recently
made a trial trip, lighted by its plant of Edison lamps in a most satisfactory manner.

EDIBON 150 LATED PILAYES, FULL LIEF. We print below a list of 31; 1618 in 1504 tel plants, aggregating 65; 145 incandescent lamps now in operation in the country and in other parts of the world. This is secured as a complete plant, and embraces only isolated plants, where the average the light finalises list own powers and owns is own objustion with the publication of this list, there are able to state in connection with the publication of this list, then there has now been after one of the list, then there has now been after our plants, and second, that we have never lead a single invalidation rejected.

PLANTS IN MILLS, FACTORIES AND INDUSTRIAL ESTABLISHMENTS.

	, 11		
NAME.	ADDRESS.	BUSINESS	Neme
American Bank New Co. Artingers Mills. Max Ann. Max Ann. Max Annerican Fraiding and Bye Works American Fraiding and Bye Works American Will Enabler Co. Allien Paper Co. Allien Paper Co. Allien Paper Co. Mercal R. Cler. Baldwin Locometric Works Baldwin Locometric Works Baldwin Locometric Works Baldwin Rosenstric Works Bandlyn Seiger Rosenstry Bandlyn Seiger Rosensyn.	Lawriter, Mass. New York (Phy. Fall River, Mass. Maechivster, N. II. Elyvorlle, Md. Clockmant, Oldo. Holyoko, Mass. North Adsurs, Mass. Peorls, III. Dreuden, Germany, Taçanrog, Ravela. Fullufolpida, Pa. Washington, N. J. Eau Buore, Mass. Fandlen, M. Bronden, M.	Consen and Weeks Mills. Carming Factory. Printing and Dycing. Conton Mill. Conton Mill. Tamary. Paper Mill. Prant Works. Agricultural Implements. Plane Factory. Mill. Nachine Shops. Organs & Panton. Sugar Refinery. Sugar Refinery.	

PLANTS IN MILLS, FACTORIES AND INDUSTRIAL ESTABLISHMENTS,—Continued.

NAME,	ADDRESS	BUSINESS	NUMA LAMP
Some Rubber Stree Co	Malden, Mass	Rubber Short	6,
Fridgeport Orean Co	Bridgeret, Ct		100
Best Bucwing Co	Milwauker, Wit	Empire Brewery	10/
latters, Peters & Co		Saw Milt	
Learn Chair Co		Chair Factory	15
Lay Name Sug of Refinery		Sugar Rofes ey	151
latavia Paper Co	Ilauvia, Ill	Pager Mill	
bergmann & Co	New York City	Electrical Weeks	35
		Derend Works	600
Th Bann	Could Moreau, Fr.		73
, Bardou & Fils	Perpiguan, France	Paper Mill	6.
behmisches Braubaus	Berlin, Germany	Bosery	127
School & Best	Auvers, Belgian	Forge	34
Art Threat Co	Newark, N. J	Placed Works	127
Serr & Hebrens	Bergen Point, N. J	Agricultural Implements	124
R. H. Celeman		Smiling	6
Senerical Mills		Conen Mill	75
Tark & Keen	Philadelphia, Pa	Waste Mil	274
Jalifornia Sugar Refinery	Ban Francisco, Cal	Socar Referry	151
k Cidhard	An Cityan, France:	Weating	16
M. Clerget	Vescal, France	tues of Provinces	14
Cavalieri & Franco			51
Principal Cressi	V	Cores Miller	- 64
Tress & Co	Bergers "		120
i. Cremi & Co	Viceyany "		104
M. Crossi	*		- 1
te St. Liennis	Crelleckowar, Aug.	Smaler Referrer	120
Se. Free bills	Newstr. America	Broke Bullers	10
Sarlemage de Presimana	Fartirens, Belgion.	total Mur	6
anolise Cerem Co	Cornwall, Canada	Comma Mill	5 20
lanforth Louisingtive Works	Patterior, N. Laurer	Largaria Westerman	
Alfred Dolgo	Dolgveille, N. Young	Popul Marrich	1.0
P. Dandiculle File and Gandin	Bardona, France	Men bours	60
Parketen & Cir	Belefeld, Gramus.	Markov Step	2.
Demletsky & City	Okrabeki, Russia	Big Frier	10
No Smot & d'Harris	Ghen, Helgian	Deced Werks	6:
Lestings Dry Plate Co	Rochester, N. Y.	Photographic Materials	6
Fall River Illeachery	Fall River, Maryon	18-uchery	144
E. & T. Fairbanks & Co		Neath	6
in Bases, Erlen & Co		Warson Mills	100
Fischer & Co	New York City	Spor Mills	11
N. K. Fairhanks & Co	St. Louis, No	Latel Works	175
			4
Finel Frères		Mill	
		Thread Works	100
Tischer & Seign		Saw Mill.	18
Films & Criticales		Thread Works	
Todaywoo & Cor			60

fage

NAME	ADDRESS.	BUSINESS.	NUMBER OF LANCE
Germanu Mills	Holyoke, Mass	Wester Mills	70
D. Guf & Sees		Braid Mill	
Gelrarii Mill			500
Gury Frères			
	Huy, Belgium		
E. I. Godie & File		Worden Mill	
James Harrison		Kunting Mill	
Harder Knining Co	Gardorr, Mays	Chair Factory	
Heywood Bros. & Co		Sugar Refusery	
Havemoyer & Elder			
Harrison, Havemeyer & Co	Philadelphia, Pa Waspurkal, France	Dre Wicks	
Hansam Frires		Thread Works	
Hardeson & Cir			He
George Hopested	Birtles Dose, Eng	Manufacturer	134
The "Harrison" Patrix Steam)	Selford, England		. 79
G. P. Ide, Bruce & Co	Troy, N. V	Collar and Cuff Factory	150
Ingeries & Circumstance	Ingerais, Fishant		
Invasestae & Cir	Investilles Finland.	M21	
Mr. Johnson	Yvaskyla, Russia	Naw Mill	
King Philip Mills	Fall Royr, Mass	Cetten Mills.	750
William Knaler & Co	Baltimere, Md	Plane Factory	60
Kern's Hounny Millers	Milwanker, Witness	Flour Mill	fe
Lauret Lake Mills	Lall River, Marray	Come Mills,	414
Lockwood Co.	Waterville, Me		250
Lorraine Woolen Co		Worden Mills	400
Lebigh Valley R. R. Co		Car Shops	150
Loble File	Paris, France		
I. Luc		Tantery	to
Ed. Lefelore	Part Anthur Prance	Thread Werks	60
Larger & Cir			
la lafebyre			
R. Leeffel & Cir	Illainville, France		
A. Langle, Joshert & Motters		Machine Shops	
Lemman & Co		Cotton Mills	
M. Labrador		Machine Works	
Enrique Lanz		Floor Mill	
		Car Shops	
Manhattas Railway Co		Car Shops	
		Print Works	
Merrimack Manufacturing Co		Thread Works	
Merrick Thread Co			
J. D. Mantheissen & Wleehers		Sugar Refuery	
McCormick Machine Co	Chicago, Illa	Harvesting Machines, &c.	130
Mill Creek Distilling Co		Distillery	
Mattenwan Manufacturing Co		Hat Factory	
' Merrick Thread Co., Mill No. 2		Thread Works	
Miller Industrial School		School	400
	Italifrance, Mid	Cotton Mills	

PLANTS IN MILLS, FACTORIES AND INDUSTRIAL ESTABLISHMENTS,—Continued.

NAME.	ADDRESS,	PUNINESS	Nesses Laura
Nostreal Course Co	Valley field, Co	Conton Mills	8.0
Slavall Rubber Co	Bradley, Marray	Rubber Factory	190
R. V. McAden	Lawell, N. Connect	Center Million	100
Stone & Mailfaveur	Roubait, France	Dyr Works	6.0
N. Morbring	Frankfiet, Germany		181
Mather & Platt	Salferd, Eng.	Engineers	11.610
D. Mawley & Sons	Manchester, Far	lafta Rubber	1,000
Mill San Christobel	Santiago, Chile	Mill	40
Nathan & Decyfus	New York City		115
National Tube Works	McKerspoot, Pa	Teleng	65
	Winstell, Com	S0. Mill	***
New England ParCo	Chicago, Ilb	Flour Mil	1 600
Narrow, Brother & Co	Dahage, love	Iren Works	500
Novelry Iron Works	Newton, Man	Worstel Mill	500
Necamen Wested Co	Pina, Italy	Corpor Mill	544
Giacono Niver	Handeury, Germany	Sugar Refuery	15
Norddeutsche Raffrerse		Forge	
M Nobel	Helsington, Rosen.	Warden Mills	197
Ohl Kenneky Wooles Mills	Louisville, Ky	Coren Mills	
Pentertos Mills	Lawrence, Mass	Ind.	375
Participant from Consession and	Petronen, Pa		
Peacolale Manufacturing Co	Peacedale, R. L	Wson Mil	/**
Park Mount Cotton & Wooden	Lenis, Parrico	Straw Boards	600
Perrage Straw Board Co	Akros, Ohio		131
II. Poshet	Paris, France	films Works	
Pondrerie de St. Chamas	St. Chamas, France .	Fowder Mill	
A. Detti	Solling Busin, Italy	Cotton Mill	
N. Perta & Co	Hav. Belgium	Sandert	
Rineshouse Manufacturing Co	Passaic, N. J	Worden Miller	
H. I. Rogers	Appleton, With	Mills	
N. Rosenfield & Co	Corporek, Germany	Lindson Factory	
N. Rosenfield & Co	Zittas, Germany		
Rochke & Bachweit	Amsterdam, Helland	Floor Mill	- 23
V. Royavaan	Helsinghes, Russia.	Paper Factory	60
M. Riecks	Ghent, Belgiste	Thread Weeks	
M. Rey Amt	Lincoln, Egg	Engineers	
Robey & Co	Stillwater, Miss	Car Shope	964
Seymour, Salin & Cu	New Haves, Corn	Meat Packers	
Sperry & Harnes	New Haves, Corns.	Hat Factory	
J. R. Strewn & Co	Pluladelphia, Fa	Pork Packers	130
J. P. Squires & Co	K. Cambridge, Mass	Couce Mills	9.0
Slater Cotton Co	Pawiocket, R. L	Come Mills	- fro
Sibley Manufacturing Co	Augusta, Ga	Wasten Millians	101
Saules & Washington	Mechanicsville, Com	Marline Shops	150
Steams Manufacturing Co Star & Crescent Flouring Mills	Erie, Pa Chicago, Illa	Flouring Mills	60
F. Shaw & Brother	Grand Lake	Tamery	6

PLANTS IN MILLS, FACTORIES AND INDUSTRIAL ESTABLISHMENTS. Continued.

NAME	ADDRESS.	BUSINESS.	Neman Br Laura
P. Schmidt & File	St. Die Person	Howery	
IL Serve	Tembura Vener	Paper Factory	140
Schafer & Hauschner		Catures	
Secieté Strentiquit		Mmr	
W. Schroder & Cit		Weaving	6
S Huckels Solme,		Let Factory	14
Schoolier & City		lat Factory	
Société La Lys.		agar Refnery	
I wast Singerin	Versiers	hread Works	6-9
Ste Asonyme Niel on Ruppel		hread Works	189
James Taylor.		actory	34
Tingue, House & Co	Newlargh, N. V C	loth Mill	125
H. K. & F. H. Thurber & Co.		~	110
		aming Factory	f-u
Trentes Iren Works	Treaton, N. J li	ne	75
O. N. Taylor		ew Mill	15
M. Tanacr	Voorfor, Rassia S	ngar Refinery	1411
Central States Rolling Stock Co	Chicago, Illa C	at Shops	125
United States Rolling Stock Co			rat
George Urban & Co		Seer Million	4
R. Versty & Southern		leetin Light Fittings	145
Valiter Brothers	Barnes, Chile F	bearing Mill	for.
Winona Mills		lear Mills	211
Wamsutta Mills.		etos Mills	750
Worumbo Mills		orden Mills	640
Williamstit Linea Co	Willimantic, Com La	ten Thread	In
Whiting Paper Co	Holyoke, Man P.	ner Mill	131
Wright, Turner & S.a	Salford, England St	intertain in commence	Green .
Warren Chronical Works	Hanter's Post, L. L. M.	annfactering Chemis!	4.
York Manufacturing Co	Saco, Me Ce	etton Mill	750

PLANTS IN RESIDENCES, STORES, THEATRES, ETO.

	NAME	APDRESS.	BUSINESS.	Nesta
				LAMP
Academy	of Music	Chicago, Illa	Theatre	175
Aitken, 5	on & Co	New York City	Dru Guada	1
American	Express Co	New York Cay	EanreadCo	1
American	Express Co	Chicago, Illa		
Gentre A	milter	Kreumach, Germany	Residence	
Albisa T	beare	Havana, Coha	Theatre	197
tiles Th		Beston, Mass	Theater	197

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PLANTS IN RESIDENCES, STORES, THEATRES, ETC.—Continued.

NAME	ADDRESS.	1028IN188.	Угива
			LANIS
Belle Janliniere		Matri	60
Rangue de France		Bek	61
Calunct Clah	Chicago, Bla	Clab Hory	1 %
Cornell Municipal			
M. Chart et		Cafe	
('h. Sale ethe		Merchant	
Chambre des Deputies		Lacoron Communication	
Considerated Telephone Company	Lambon Fundand	Offices.	144
Architeld Corp		Rendenga	191
City and Guids of London b		College	200
Marlame Commo	Santiage of Sale	Residence	
Cafe Guester		Restaured	700
(1 W. Doore,)			
Marshall Field.			
Falson Ketth.	Christer, Illiano	Residence	210
O. R. Krift			
	Baltimere, Md	Storage Battern Services	
Davis & Prod		Office & As and a service	
	on Years N. V.	Harden	176
Excren's Hotel	Jerus City, N. J	Doger commence	
Ene Grate Flewater		May an	
Easte des Benus Arts	Resp. Reb	Office Assessment	10
E. E. L. Co (Lensed	Manchester, Feedand	Dry Goods and a con-	
Marshall Field & Co	Clorage, Illa	Resident and a second	. 5
N. K. Fairhanks	Clerase, Re	limit	6.5
First Nat'l Rank	Cincago, Ille	Phates.	350
Ford's Opera House	Baltimore, Mil	Held	350
Green Island Hotel	Lake George, N. V.		150
G. Gerbaud	Narlemer, France.	Merchant	17
ties, for Electra Light	Cod-gav, Genrany	Mark	154
Guttschalk & Co,,,,,,,	Mande bear, Fug	Merchants	110
Hotel Exerct	84 Chathan St. N. V.	Herd	134
Hotel Vendome	Haven, Mars	Herri	03
Haverly's Theatre	Chicago, Ills	Theure	6-17
Htts: Continental	Paris, France	11std	140
Hof Phelter	Dresden, Germany	Theore	144
Hollson Restaurant	London, Eng	Resustant	1,000
House of Commons	Westminster, Eng	Dining revers and Library,	160
House of Assembly	(Cape Fewn, Cape)	Parlument House	144
E. S. Jaffray & Co	New York City	Dry Goods	170
Jurdan, Marsh & Co	Boston, Mass		at a
Konigl Resident Theater	Monich, Germany	Theatre	2000
A. W. Krasespeldy	America, Helland	Cafe	70
George S. Ladd	San Francisco, Cal.	Agency	fu
Light & Force Co	New York City	Storage Staterics	15

1:

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PLANTS IN RESIDENCES, STORES, THEATRES, BTC.—Continued.

ALC.—Continued.							
NAME.	ADDRESS.	BUNINESS	Numer				
			Luxers.				
N. Lentovsky	Nischal Navgo-1	Theatre	60				
J. Perpost Margan	New York Chy	Residence	50.7				
Minork Coal & Cole Co	Minonk, Illa	Residences, &c					
Mettalf Bres & Communication	Detroit, Mich						
Merchants Nat'l Bank	Chicago, Ill	Bank					
Magasine du Bon Marché	Parls, France	Stores					
Magasine du Louver							
Maier Locui Frères	Passau, Germany	Rendence					
Mused da Nord	Bruxelles, Belgium						
M. D. Mdb	Chicago, Ills	Residence					
National Life Insurance Building		Insurance	131				
Prospect House	Hipe Monstain Lake, N. V	Heed	125				
Palmer House		Hetel					
C. W. & E. Pardridge & Co		Dry Gards Storrs	310				
Post Office, &c	Watertown, N. V	Stores, &c					
Post Office and Depat	Stuttgart, Germany	Post Office, &c					
F. de Poskas	Pest, Austria	Agency					
Resource	Berlin, Germany	Ciab					
'Royal Institution "	Manchester, Fag	Picture Gallery	bu				
II. D. Smith		Residences, Pactories, &c.	240				
St. Charles Hotel	New Orleans, La	Hotel					
State House		Home of Representatives					
P. B. Shaw	Williamsport, Pa	Sees, &c					
T. Taylor Smith	Enfield, England	Residence	· cs				
II. K. & F B. Thurber & Co		Wholesale Groveries					
Spencer Trask & Co		Bankers	15				
Theatre de Brism	Britte, Austria	Theatre	Hi-o				
Theater do l'arc	Bruselles, Belgium		500				
Theater Royal			500				
University of Missouri	Columbia, Mn	Cidlege	60				
U. S. Military Academy	West Point, N. V	Aculemy	60				
Union Club	Berlin, Gennary	Clab	***5				
Union Ran Geselschaft	Vienna, Austria	Restaurant	35"				
William Vogel	Munich, Germany	Restaurant	84				
Von der Herdt	Elterfeld, "	Residence	130				
J. Hord Wright	Fort Washington,	Kesidence	240				
Western Edison Light Co	Chicago, Ills	Agency					
R. H. White & Co	Boston, Mass	Dry Goods	750				
Wilshire Building	Cleveland, (Mis	Officire, &c	400				
Prof C A. Young	Princeton, N. J	College	3rs				

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PLANTS IN NEWSPAPER AND PRINTING OFFICES

NAME.	ADDRESS	BUSINESS.	LOW
A. S. Abell & Co	Baltimore, Nd	The News	
Advertiser Huilding	Boson, Nav	Dudy Advertise T	
Lanes Gordon Bernett	New York Coy	New York Hereld	500
W. Busenstein	Berlin, Germany	Prater	- 4
George W. Childs	Philadelphia, Pa	Latyer Building	390
Discusse la Marina		Newspaper	6.
Garette Publishing Co	Davenport, because	Davemport Gardie	120
Quette de Colorne			121
Hirds, Ketchan & Co			241
Harbone & Cir.			-
A. Labure			6
Morning Herekl		Newspaper	
Marchener Guardien	Manchesser, Frig	Newspaper	
Ohio State Journal		Newspaper	
R. M. Polofer & Co		Bears Henrid	
Record Room		Con't Printing Office	
Rand, McNally & Co	s Chinese Illa	. Publishers	1.7
Rand, McNally & Ot	tude delete	Newspaper	29
Weed, Parson & Co	Alberta V. V		

DE ANTO ON STRANSHIPS ET

PLANTS	ON STEAMSH	IPS, ETC.	
NAME.	ADDRESS	BUSINESS.	Neuse or Lons
John D. Adams. Janus Gordon Bernstt Illitimere Steam Packet Co. Brazilian Steamship Co. Conjuguie la Flastone Clin Lime. Fall River John Ay Goods Go	New York Coy. London, Pagland. Fall River, Mass. New York Coy. Ser In Yulgs, Russia New Lundon. Fortland, Orepet.	Vario Namonia "Vegena" (Cerolina" "Vegena" "Vegena" "Vegena" "Rob Tarma" "Aprilo" "Marces" "Clan Marcellar" Scame "Highen" "State "Highen" Nounces "Countia" Nounces South "Additional "Nounces Southing "Countia" Southing "Adentica" Southing "Adentica" Southing "Adentica" Southing "Adentica"	120 126 130 130 150 150 150 150 150 150 150 150 150 15
Royal Navy	England	M. S. Troopship "Malabar"	373

PLANTS ON STEAMBOATS, ETC .- Continued.

NAME	ADDRESS.	BUSINESS	Newson or Learn.
U. S. Fish Commission. Cross S. S. Co. of New Zealand. Union S. S. Co. of New Zealand. Union S. S. Co. of New Zealand. Williams & Grass. Williams & Grass.	Lordon, England	S. S. " Faravera "	190 190 190

PLANTS IN RAILWAY STATIONS, ETC.

NAME.	ADDRESS	BUSINESS	Neum
American Ship Hullding Cr. 1. Mescri, Alpregiana . Uniquegian de l'Onest. Uniquegian de l'Onest. Uniquegian de l'Onest. Chandre Imperat. Dia de l'American Merilli. Le S. S. W. Reithway Cr. 1. Le S.	Combinegor, Cuba. S. Paris, France. B. Sirrathoneg, Germany. P. Sersel, Germany. P. Sersel, G. Sers	egar Kesste. R. Station R. Station R. Station sek Vard R. Station atrelio Station gar Estate conship becks gar Estate township becks gar Estate township tokks to	84 221 1,254 244

WATER OAS PROSIDITED IN MASSACHUBETTS. Water gas is prohibited in Massachuses by the Statues of the State. The law was originally passed on the expect of officials and expenses setting forth the danger to health and life in the time of water gas in buildings. The prohibitory clause providing that no gas shall be unannificationed on used containing the contained in Sect. 14, Chap. 61, The 10th Chauter of Massachusetts.

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WATER GAS VERSUS COAL GAS. A correspondent in the American Gar Light Journal, May 2th, writes as follows of attempts now being made by a certain water gas organization to "illecee gas companies":

"If I are coverely informed a gas toposition cross have based of seption to rath the effector of companion of this courtly in the shape of opposition works, and the small self-out, composition, or divide protects in fact, practice, are ord lawful prices to the topological content." This facility are of the based channel or affect, and other contents of the content of the content

COAL GAS VERSUS WATER GAS. The London fournal of Gist Lighting, April 17th, referring to the Philadelphia Water Gas fournal, published "in the interest of water gas speculators," and speaking of the "wat" between water gas and coal gas, surs;

" In the second number of the publication in question, the war is prosecuted with a vengeante. There is an article entitled "Asking for the Repeal of an Infamous Law," which, on peruval, we find to be an enactment of the State of Massachusetts, to the effect that gas containing more than to per cent. of carbonic oxide shall not be sold in the State. Most people who are not 'selfish and impertinent monopolists' -- to quoe a phrase in the article which is capable of other application than the writer intended -will wonder why an apparently benificent restriction on the sale of a poisonous gas should be thus qualified. This is the way our young contemporary disposes of the subject: - 'No person, scientific or otherwise, has ever pretended to give any reason why water (the purest element in nature) should make the coal and oil parts of the gas more poisonous than the miserable stuff hitherto sold in mine. tenths of the towns and cities of this country.' Upon the question of carbonic axide the water gas people are, of course, very sore; and the more mention of It as a poison excites the new journal—we were about to say to a hydrophobic fronzy; but upon consideration, it appears that hydrophobia is, in their eyes, the fatal maledy of coal gas enthusiasts. A great portion of this second number is made up of reprints of experts' opinions to show that carbonic oxide is rather a balmy compound than otherwise. It is tackly admitted that the mention of carbonic oxide poleoning is the rock upon which water gas schemes are apt to split, and their advocates are evidently driven to their wits'

10

ent by the timely publication of a list of about a lumifred cases of death by gas pulsaming in the water gas lighted districts of New York and Brooklyn. Exica are stubborn highe; and all the array of chemists and pillosophers with only be induced, for a consideration, to swear that carbonic solide is, in their opilion, not an objectionable ingertain in limituatings; will not remove the disagreeable impression created by one plath worlder of a commer's jury. We fore that these bundlerd fastlies will continue to like hearth on the Titater Gas.

WATER OAB FORBIDDEN BY LAW IN NEW JERSEY. The Sattess of New Jersey prohibit the use of water gas. The date of the original prohibitory has was March 8th, 1873, and the pro hibitory clause, forbidding the use of gas "containing more than two per centum of carbonic oxide gas," can be found on page 1342, revised Satures of New Jersey.

No. 19.

NINETEENTH BULLETIN.

The Edison Electric Light Company

65 FIFTH AVENUE, NEW YORK.

August 15th, 1883.

(These builtetins, originally issued as a convenient way of asswering the nequiries of datast agents, are now, in response to numerous respects, sout also to all stock-builters, to great them subernation of the progress of the Company and of other natures of greater or less interest connected with electric lightings. Agents are particularly responsed to communicate to the Problect whether practical points of general interest may be developed by their experience in installing or operating our lights.

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ermany. An Edison Company	19
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FIRST DISTRICE, NEW YORK OTFY. This plant still runs with entire success, being now in its wedfal mench of continuous operation, without a stop, even for a naissue. Nearly all the customers the station can safely supply are now connected, and we are making now econnection, save in exceptional cases where lights are burned cither for many connecturive hours during the day or all night. The nateer works perfectly, and our customers continue to be satisfied both with the price of the light and the light itself. We are at present lighting 413 hours, where for hand to pool humps.

MR. AAY OUTLINE YAORY LIGHTED. A plant of one L. dynamo, with a capacity of 150 A lamps, has been installed on Mr. Jay Gould's new packt, the "Atahanta." The dynamo is driven by a 65x 8 Armington & Sime engine, located in the engine room, on the standoral disk of the vessel. The main conductors for the light run fore and aft, in four distinct circuits. There are 116 lamps installed in the interior of the weed, Plancel as follows:

Social II-II

Dining Saloon 20	ocar man	•				11	Lamp
Passage Ways 8 Mr. Gonld's Private Room 4 Private Bath Room 1 Engine and Fire Rooms 23 Shaft Alley 3 Partry 2 Cappain's Room 4 Mess Room 4 Kitchen 4 Miscellaneous 21 Miscellaneous 21	Dining Salor	m				20	41
Mc Gould's Private Ruon Private Blath Room Engine and Fire Rooms 23 Shark Alley 3 Pentry 2 Capualis Room 4 Kitchen Kitchen 11 Miscellaneous 11	State Room	Toiler	s -			11	
Privace Bath Room	Passage Way	s				S	**
Engine and Fire Rooms 23 Shah Alley 3 Pantry 2 Captain's Room 4 Mes Room 4 Kitchen 4 Miscellaneous 21	Mr. Gonld's	Priva	e R	нип		4	**
Shoft Alley 3 Panty 2 Captain's Room 4 Mess Room 4 Kitchen 4 Miscellancons 21	Private Bath	Roon	:				ü
Pantry 2 Captain's Room 4 Mess Room 4 Kitchen 4 Miscellancons 21	Engine and	Fire F	toom	s -		23	
Pantry 2 Captain's Room 4 Captain's Room 4 Captain's Room 4 Captain's Room 4 Captain C	Shaft Alley					-	
Mess Room 4 11 Kitchen 4 11 Miscellaneous 21	Pantry -						**
Kitchen 4 Miscellaneous 21	Captain's Re	om		-		4	
Miscellaneous	Mess Room					4	
	Kitchen					4	
Total 116 "	Miscellaneon	IS				21	
		Total				116	**

There are also three 32 candle-power lamps enclosed in a Fresnal globe, which serves for the mast-head lantern. This, together with the red and green sailing lamps on the port and satroloard sides, each of which is lighted by two 32-candle lamps, are entirely new features in steam-ship lighting.

NEW YORK. FERRY BOAT TO BE LIGHTED. We have received an order for a plant of one Z dynamo and 65 A lamps, to light the ferry-boat "Fanwood" belonging to the Central Railroad Company of New Jersey.

BOSTON. PLANT FOR OHICKERING & SONS. We are installing a plant of one L dynamo and 174 A lamps in the piano show rooms and music hall of Messrs. Chickering & Sons, Boston, Mess.

NEW BEDFORD, MASS. PLANT FOR CORD WORKS. We are installing a plant of one L dynamo and 160 A lamps in the works of the New Bedford Cordage Company, New Bedford, Mass.

A NEWSPAPER PLANT INOREASED. BOSTON. Messrs. R. M. Pulsifer & Co., (The Boston Ideals), have enlarged their plant by the addition of one II dynamo, 350 lamps, thus making the total capacity of their plant 500 A lamps. This increase was ordered after trial of an infringing lamp which lad proved to be unsatisfactory.

BOSTON. TESTIMONIALS FROM STATE HOUSE. We print below letters received from the Speaker of the House of Representatives, and the Chief Engineer of the State House, Boston, in recard to the Edison plant installed there:

(253)

"COMMONWEALTH OF MASSACHUSETTS, I HOUSE OF REPRESENTATIVES, BOSTON, July 20th, 1883.

Mr. SPENCER BORDEN,
Manager New England Department,
Edison Electric Light Co.

Data Stat—In 1876 to your favor of old mod. In reference to the injust on the librace of depresentative, State House, Anton, I would say that I sould not the librace of depresentative, State House, Anton, I would say that I should not be a simple of the depresentation of the same. I have not been the slight scate afternoon of the same of th

GEO. A. MARDEN, Speaker of the House."

The following is the letter from the Chief Engineer of the State House, Boston, who has charge of the Edison plant, above referred to:

"STATE HOUSE, BOSTON, MASS., July 20th, 1883.

Mr. SPENCER BORDEN,

Data Sixt—in your letter of yoursity you ask nei reagrad to the working of the system descrite [classive sixth your company] moulted a the State House hat winer. I have had charge of the same risker it start in the State House hat winer. I have had charge of the same risker it start for the same start in the same sta

1:161

GEORGE E. STAFFORD, Chief Engineer," THE EDISON LIGHT AT THE RAILWAY EXPOSITION, CHICAGO. The following extract, relating to the Edison light at the Exposition of Railway Appliances recently held at Chicago, is taken from the Scientific Times, July 2181;

"Many of the most important displays made at the Exposition were not placed in the competitive list, as the main object of their inventors and owners was to place them before the public and give the public an opportunity to judge for themselves with respect to their several merits. Many of the exhibits also Lelonged to the class of thoroughly tosted and well-known systems and appliauces, of acknowledged standard excellence, which stand each at the head of its class. Such is the character of the celebrated Edison lineanlescent Electric Light, whose former success, supplemented by the victory at the Exposition, remieralt certain that this system is the most practicable yet discovered for illuminating by electricity. One hundred and fifty of those lamps were placed under the water and spray of the great fountain and produced an enchanting effect. The peculiarly brilliant but mellow light gained for it many friends; in fact no unprejudiced person could be itate for a moment in declaring his preference for the Edison system both with clear and colored lamps. The are systems in operation concentrated the light into one small spot of intense brilliancy, constantly scintillating and changing colors, always trying and often very injurious to the eye. The incandescent system, on the contrary, is a soft, steady light, bright as the best quality of gas light, and very pleasant to the nerves of the eye. It seems to diffuse the light without first concentrating it. This is the principle upon which Mr. Edison's celebrated meandescent electric light is constructed. It is especially adapted for industrial or domestic purposes.

ANAMOSA PENTERSTEARY. ANOTHER TESTIMONIAL. The following is a copy of a report made by Mr. A. E. Martin, Warden of the lowa Pentientiary, where an Edison plant is in use. This report goes first to the Iowa Commissi-uses and from them to the Governor and Legislature. The report is as follows:

"Warden's Office, Pententeney, A. E. Martin, Warden. Anamora, Iowa, July 12th, 1883.

WESTERN EDISON LIGHT Co.,

53 Walnash Avenue, Chicago, Ill.

Since June 1st, we have kept an accurate account of the fuel consumed
by weighing all the fuel used each day during the anonth of June.

(367)

We have run our dynamo po days, using 143 Jangs 20 and one-half hours in the 30 days, consuming for this use 3,281 of feel, with the following result: For 5 days we used the best Southern Illinois onal, running 3 and three-quarters hours in the 5 days and using 386 of onal, which gives an average of 77,2 or Ft day, at a cost of \$15,70 per for unkest the cost per fully \$0.14,926, or per hour the amount consumed is 67,13 which at the \$3,70 per ion, given the cost a \$6,014,10.

For 16 days, we used common Illinois coal, running 15 and threequarter hours in the 16 days and used 1,356 of coal, an average of \$4,75 per day, which at \$3,70 per ton, gives the cost per day \$5,15670, or per hour the amount of coal used was \$6,09, and the cost per hour \$6,15936.

For fine days we used slack from common lillinois coal, running 8 hours in the nine days and used 1,530 of slack, at an average of 171 per day, which at a cost of \$1.95 per ton, makes the average cost per day 50.1667, or per liour the amount of slack used was 192.125, and the cost per liour 50.1873.

RECAPITULATION.
143 lamps run during the month of June 1883.

run during the month of June 1883.

5 days at \$0.14282, \$0.7141

16 days at \$0.15679, \$2.5085

9 days at \$0.16672, \$1.004

9 days at \$0.16672, \$1.5004 30 \$4.7230

Average cost per day 50.15743.

Lag lamps run during the mouth of June 1883.

5 days 1.15 hours per day. 5.75 hours

16 days .984 hours per day. 15.75 hours

16 days .984 hours per day, 15.75 hours, 9 days .889 hours per day, 8.00 hour 30 29.50

143 lamps used 29.5 hours costs \$4.723 gives 16 cents as the cost per hour for the whole number, and the cost per lamp for one hour \$0.001,118, cost of lamp \$1.00, life of lamp 600 hours.

Cost per hour \$0.001333
Total cost per lamp per hour \$0.002451
We have 220 lamps, which if all had been used, would have reduced the

We have 220 lamps, which if all had been used, would have reduced the average cost per lamp.

When candles and oil are used, the cost per hour was \$520, comparing this with the 16 per hour, the cost of electric light, the economy of the latter is readily seen, but the whole advantage or gain is not in the actual cost alone, but the quality of light in present use is greatly superior to that of candles and

Respectfully,
A. E. Martin,
Per L. Prarson,"

COENWALL, PA. TESTIMONIAL. The following letter refers to one of our plants which has been in operation over a year, and affords gratifying evidence of the satisfaction given by the

"Cornwall, Lebanon Co., Penn., July 30th, 1883. Edison Co. for Isolated Lighting,

65 Fifth Ave., N. Y. City. GENTLEMEN:—The light furnished by your plant at my Conwall office and furnaces is so satisfactory that I have determined to investigate the cost of a similar plant for my house, stable and grounds.

Yours truly, ROBERT II. COLEMAN,"

PITTSBURG, PA. A NEWSPAPER PLANT. We have received an order from Mr. Robert P. Nevin, proprietor of the Pittsburg Times, for a plan consisting of a small dynamo and 25 A lights.

BENEFICIAL EFFECT ON THE EYESIGHT OF THE INCANDESCENT LIGHT. We take the following paragraph from the Medical Record, New York, July 21st:

The allocation is the rather of any particular source or artificial high, replace hadronic from editors of the replace and produce the procession of the replace and the repla

employed is unitarily that any ill effects have been observed. It may be considered as an established axion, that the fulfilling vad notingueldam of any light are as nothing, in respect of fits value as an illustrating mellum for continuey uses, compared with the contact, and interfaces, and interfaces. The this interaction of atmospheric art had hadron, I would be provide the continue to the co

CAMPEONE, MEXICO. TESTIMONIAL. We have received the following testimonial from Messis. Definold & Co., manufacturers of logwood extracts, near Campeche:

"LADINA DE TERMINOS, MEXICO, JURE 15th, 1883. TO THE EDISON ELECTRIC LIGHT CO., New York.

We are, gentlemen, Your most obediert servants,

t obedier t servants, Districtly & Co.**

LAKE GEORGE, N. Y. ROTEL LIGHTED. The following letter was received by our Pfüladelphia agent from the Manager of the Sagamore Hotel, Green Island, Lake George, where we have recently insalled a plant of 350 lights:

"Bouton, N. V., July 14th, 1883.

Joun Hoskin, Agent, Room 6, Ledger Bulkling, Philadelphia.

DEAR SIRT—The Electric lights are running very satisfactorily. Every one is delighted with them.

M. O. Brown, Manager."

13101

DAVENPORT "GAZETTE" AGAIN. TESTIMONIAL. The following is a testimonial received from the Davemport Gazette, which is supplied with the Edison light from a small central station at Davembert:

"DAVENPORT, IOWA, June 4th, 1883.

TO THE WESTERN EDISON LIGHT CO., Chicago.

GEVES:—The Ellion electric light has been in constant use by the Davest port Gazette Company for more than six months. It has been so used in lighting the business office, eithernal rossus, ross-composing rosso, joh office, press, engine and habite rosms, in a word, the entire Gazette establishment, to the exchaining of all other lights.

Bolsho, the plant of the Tavaupur Electric Light Courson, from which to clearly is supplied, fumilised the Elder Boll [and also the Bris Stot Office, the Addry House, the hat size of W. S. Cameron & S. Su, the wholesel solution substance of W. Kinders, and the wholesel and the retail defining force of monthoding of the Courson of the Workshot and the retail defining force of continuol see has been not only entirely sufficiency and particularly grantle, The light is receilly and constrainty mataliand at a underso helitancy and illuminating power. It was it found to be pleasant and so donly to the conference of the Courson of the

its prace.

It is the opinion of experienced compositors that an average of to percord, more type can be set up at might under the Dilson light than moder light to story gar, and with morth low vectors to the eye. Two-smally, I can be accessed to the eye of the contract of the property of the proper

All persons here using the Eillson are delighted with its efficiency of servke, its regularity and evenness of volume and the softness of its brilliancy. It is 'the light of lights' in our esteem.

Yours respectfully,

EDWARD RUSSELL,

Felitur "

LONG LIFE OF EDISON LAMPS. We have received the following letter relating to an Edison plant is use in the mill of Messrs, Clark & Keen, Philadelphia:

()70

"Pitti Atoki Pitta, June 26th, 1883.

Jour Hoskin, Esq.,

AGENT EDISON CO. FOR ISOLATED LIBRITING,

DRAK SIKE-Yours 23d inst. to least. Lamp record to Saturday, June 23d is as follows:

CLARK & KEEN."

The above statement shows an arerage life of our lamps at this establishment of 3,886 hours, being 3,286 hours in excess of our guarantee.

TESTIMONIAL FROM EMPIRE BREWERY, MILWAUKER

We have received from the Western Edison Light Company the following testimonial relating to an Edison plant in the Empire Browery:

"MILWAUKEE, Wis., June 2d, 1883.

WESTERN EDISON LIGHT COMPANY,

51 & 53 Wanash Ave., Chicago, Ill.

Gentlemen:—The Edison electric light with which our Empire Inverse and the bindlings connected therewith is provided, has been in actual operation for the last five months, and, it affords in pleasure to state, has proved entirely saturfactory. The experience and ubservation we have gained nirring that time justify as in expressing the implies that for ure purpose this system is decidedly superior to that of the gas light, and we hereby gladly recommend it as such.

Yours very truly,
PUILLIS HEST BERWING Co.,
By CHAS, BEST, Sec'y."

PEORIA, ILL. TESTIMONIAL. The following letter has been received by the Western Edison Light Company:

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"Office of R. H. & C. H. Avery, i Manufacturers of Corn Planters, &c. (Proble, Lt., July 18th, 1883.

WESTERN EDNOS LIGHT Co., Chicago, III.

GENTIMENT—We have been using with great satofaction the plant withly on put in our factory last winter: a partition of the thiot running all night with very finite experse; to obtainer from far card all the light we zero!; and at the leather or machinery, just where we most need it, find a very great conventioner.

In fact we know of no artificul light we would exchange it for.

Voors truly, R. H. & C. H. Aveny,"

AUGUSTA, GA. ANOTHER COTTON MILL TO BE LIGHTED. We have received an order from the Enterprise Manufacturing Company to light their Cotton Mill at Augusta, Ga., with a plant of two dynames and 550 Å lamps.

TESTIMONIAL FROM A PIANO FACTORY. We have received the following testimonial from Messrs W. Knibe & $C\alpha$, who are using an Edison plant in their plano factory:

"Ballinort, June 4th, 1883.

EDSON CO. FOR ISOLATED LIGHTING.

og Fills Ave, Nev York.

Data Sitts-1 megjet up sør farær en are gjel ti nary flat the Islem light has gelen prefere assistations. We are reding 1 jernem for flat far for the prefer assistation. We are reding 1 jernem for the present assistation of the present as a prefer for the present as a prefer for the present as the present as a presen

Yours very truly, W. Knase & Co."

1575-

NEWBURGH, N. Y. ANOTHER TESTIMONIAL FROM MR. JAMES HARRISON. We quote below a letter received by one of ouragents, Mr. Charles T. Hughes, from Mr. James Harrison, in whose mill an Edison plant has been in use since September 28th, 1881;

"Office of THE ORANGE Co. WOOLEN MILLS, J NEWBURGH, N. Y., June 12th, 1883. [

Mr. CHARLES T. HINGIES. DEAR SIR:-In reply to your impairies I will say that the longer I use my Edison light the better I am pleased with it. The fact of the matter is b cannot say too much in its favor. It is cheap, it gives a good light, by which

colors (including green and blue) can be distinguished at night by its aid, and last but not least, it is absolutely safe. If you should ever organize a company in this city, I would thank you to give me an opportunity to become a nember of it.

JAMES HARRISON."

DAVENPORT, IOWA, TESTIMONIAL. The following letter has been received by the Western Edison Light Company in regard to the Edison plant operated by the Davenport Electric Light Company:

"DAVENFORT ELECTRIC LIGHT Co. I DAVENFORT, June Sth. 1884, (

WESTERN EDISON LIGHT CO.

GENTLEMEN:-In answer to your favor of 6th iost. I take pleasure in saving that this company has had in operation sloce January last an Edison light plant consisting of a six-by-eight and one-half Armington & Sins engine, and a 150 sisteen-caudle light dynamo

The plant has worked perfectly since its installation

Light is supplied from it to the Davenport Gazette, Post Office, Ackley me, W. S. Cameron & Son, hat store, N. Kulmen's tohacco factory and R. Krause's wholesale and retail clothing house.

The light is giving perfect satisfaction and is preferred to gas or any other illuminate

The light is sold cheaper than the prevalent rates for gas here and is paying a good profit on the investment, so that we are more than satisfied with the enterprise.

WM. RENWICK, Treas."

LAKE GEORGE, N. Y. HOTEL LIGHTED. The plant at the Sagamore Hotel, Green Island, Lake George, which was mentioned in the last Bulletin, has been installed and is now in operation. The plant consists of one H dynamo with a capacity of 220 A lights, the motive power being supplied by a 93/2 x 12 Lawrence engine. The boiler, eagine and dynamo are placed in the engine from, which is situated about 350 feet from the hotel, to which the current is earried by outside conductors. The distribution of the lamps is as follows:

172 Lamus in Sleeping Rooms, one lamp each.

12 Halle

Billiard Room.

Har Room,

Office. Main Entrance.

Main Parlor. 12

6 Private Parlors

Dining Room. 33

Private Dining Room. 2 Parches 10

Kitchen and Lanudry.

13 45

Closets, Bath Room, Barber Shop and miscellaneous places.

Total, 369 lamps.

CONTRACTS CLOSED BY THE WESTERN EDISON LIGHT COMPANY. Since the last Bulletin, the following plants have been solil by the Western Edison Light Company:

(1). A plant of two K dynamos and 640 A lamps, to light the retail dry goods establishment of Mesers. Mandel Brothers, Chicago, Ills. (2). A plant of one Z dynamo and 60 A lamps, for the flour mills of Messrs. E. Sanderson & Co., Milwankee, Wis.

STEAMSHIP LIGHTING IN EUROPE. An order has been received by the English Edison Company to light the steamer "Clan Melmosh" of the Clan Line, with one L dynamo and 150 A lamps. This is a sister ship to the "Clan MacArthur" which was lately fitted up with our light. The owners were so pleased with the success of the light on the latter vessel that they gave the order to light the "Clan McIntosh" with Edison lights without inviting tenders from any other electrical companies.

U. S. NAVY. STEAMSHIP LIGHTED. A plant of one 1. dynamo and 150 A lamps is being justalled on the United States Steamship "Trenton," now at the Brooklyn Navy Yard.

SAN FRANCISCO. STEAMSHIP LIGHTED. We are installing a plant of one dynamo and 100 A lamps on the Steamer "Kinan," which is to run between San Francisco and the Sandwich Islands This steamer belongs to the Oceanic Steamship Company, and is now being built at Philadelphia by Messrs, W. Cramp & Sons,

PORTLAND, OREGON. STEAMSHIP LIGHTED. We have received an order from the Oregon Railway & Navigation Company to install a plant of one L dynamo and 300 B lamps on their steamer "Alaskian."

BUFFALO, N. Y. FLOUR MILL TO BE LIGHTED. We are installing in the flour mill of Messrs, Thornton & Chester, Buffalo, a plant of one Z dynamo and 60 A lamps.

ATLANTA, GA. OOTTON MILL PLANT. We are installing a plant of one H dynamo and 350 A lamps in the Exposition Cotton Mill, Atlanta, Georgia.

AUGUSTA, GA. COTTON MILL TO BE LIGHTED. We have received an order from the John P. King Mill Company for a plant consisting of two dynamos and 765 A lamps, to be installed in the King Mill. Augusta. Georgia.

BALTIMORE, MD. PRINTING-HOUSE PLANT. An order has been received from Messrs, William L. Hooner & Sons, (the Horald Publishing Co.), Baltimore, for a plant of one L dynamo. 100 A and 100 B lamps, to light their printing establishment.

PORTLAND, OREGON. TRANSFER BOAT TO BE LIGHTED. We lawe received an order to light the transfer boat "Kalama." belonging to the Northern Pacific Railroad Company, with one Z dynamo and 60 A lamps.

EDISON FIRE ALARMS IN HOTELS. An ingenious device has been arranged in connection with the circuits of the Edison Central Station in Santiago, Chib. There are four hotels in the district lighted, and in each of them is being introduced a series of fire alarms. In addition to the lamp or lamps used to light the bedrooms, another lamp has been placed near the ceiling of each room, so as to be out of reach of the occupant, while other lamps are arranged in the halls and at the exits. Electric hells are also placed in the halls. The whole of these lamps and bells are embraced in one circuit which terminates in a switch placed in a recess in the wall in some conspienous place. This recess is covered by a pane of glass to protect the switch from careless or malicious use. In case of a fire breaking out in the hotel this pane of glass is to be broken and the switch closed, thereby lighting all the lumps and ringing the hells. By this device, therefore, the guest is not only apprised of the danger, but is provided with sufficient light by which to escape. The cost of installation

is small and the working expenses trilling, while the arrangement is so simple that nothing can ever get out of order.

PAWTUOKET, R. I. PLANT INGREASED. Mesors D. Godf & Sons, who have been using the Edison light in their haid mill at Pawtucket, R. L. have increased their plant from a Z dynamo and lamps to an II dynamo with 350 A lamps.

BANITARY EFFECTS OF THE EDBON LIGHT IN THEATERS. A series of careful toss, with a view of comparing the difference between gas and electric illumination, has recenily been made in the Koyal Residence Theater, of Munich, with its lighted by Edison hamps. These tests were made by Dr. Max Von Pettenkofer, Royal Pirry Gomnselber and Professor of the Hygenic Institute of the Royal Ludwig-Maximillan University, Munich, Dr. Von Pettenkofer's report, after describing the numerons tests node with gas and the Edison light, both in the empty theater and during performances, concludes as follows:

"From the aforesaid tests, the following two conclusions have been reached to a certainty:

FIRST. That electric illumination prevents, to an eminent degree, an excess of lorat in the atmosphere of a theatre.

exceed on the interest property of the propert

PHILADELPHIA. PUMPING STATION TO BE LIGHTED. An order has been given to us to install a plant of one Z dynamo and 60 A lamps in the Belmont Pumping Station of the Philadelphia Water Works.

. ,

AUGUSTA, GA. ANOTHER COTTON MILL PLANT. The National Manufacturing Company has ordered for its Cotton Mill at Augusta, Ga., a plant of one L dynamo and 125 A lamps.

Tais plant will replace are lamps, which have been taken out

ORMANY. AN EDIDIO CONTANY. Under the third of 'Ya-Grenne Elbino Georgian For Applied Heritagin's "Company has recently been organized to exploit the Elbino system of lighting throughout the whole of Germany. The parties to the constrean under which this company was formed were, beldes All. Elbino and the Elbino Sperier Light Company of Empay, Elainted, the Companye Continentale Elbino, the National Bank of Demechands, the banking house of Mesors, Statistant Doubers, the banking house of Jacob Landau, and the German eva-strate-ship of Mesos. Stemme of Jacob Landau, and the German eva-strate-ship of Mesos. Stemme of Jacob Landau, and the German eva-strate-ship of Mesos. Stemme of Jacob Landau, and the German eva-strate-ship of Landau. The Albela: This hatter fam will that a very positionary part in the strategier and installation of Elborn pluts in Germany, under this continuation of Elborn pluts in Germany, under this continuation of filteres.

The capital of the German Company is 5,000,000 Marks, divided into 10,000 shares of 500 Marks each, and the period for which the common is formed is 50 years.

TESTIMONIAL FROM KOLD'S RESTAURANT, NEW YORK. The following letter is from Mr. Richarl Kolb, one of our customers in the First District, supplied with light from the Pearl Street Station. The letter was written to a gentleman seeking for information about our light, and we publish it with his consent.

"Kole's Restaurant, 16q Paul Steel, May 3d, 1883. Col., G. W. Sherman.

DFAR SIR: -1 like great pleasure in answering your ropity in regard to Elibert's Incandescent Electric Light, which there been using for the last time months. It has been glying meenite satisfaction, and is give most perfect light that I have ever need, its cost is no more than gas, in fact it has no epail.

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with any hight so far in use. It is bright, steady, clean and easily managed, and always there when wanted, day or night, and entirely tree from danger of fire.

In my estimation 1 consider this the most perfect mode for illuminating, and should it be even more expensive than gas, 1 should not like to be without

KICHARD KOLIL"

Vomes

HYGIENIC SUPERIORITY OF INCANDESCENT LIGHTS.
The following tribute to the hygienic superiority of the meandescent

lamp in dwellings is taken from an article by B. H. Thwaite, C. E., F. C. S. I. entitled "A Hygienic comparison between the Light of Electricity, and that of Coal Gas," printed in the American Gas Light Journal, May 16th, 1881;

"The heat developed by the resistance of the minute filament of carbon. as arranged in the incondescent lamp of Edison, would not, of course, produce any rearrangement of the gases constituting the atmosphere; and even if it del, as the filament of carbon is fixed in vacue, there could be no possible vitation of the atmosphere. Thence per 10 the electric light of the incandescent type is hygrenically satisfactory. Besides the nitrogen oxides produced by the arr light, probably as much carbon dioxide is produced, in amount, for the same illuminating power as is produced by the combistion of creal gas. In both descriptions of artificial light the huminosity proceeds from the same cause, namely, carbon in an atomic or solid state heated to incare. descence. The electric light produced by incondescent learner is in almost perfect accordance with the laws of visual or ocular hygiene; allowing, as it does, various colors to be distinctly chosen as in solar light. The over light, lowever, is not so satisfactory. The varying light-densities, caused by the use of heterogenous earlants, prosince ocular muscular fatigue, besides rendering the retinal image very indistinct. It is generally conceiled that the nearer ing the remaining very insumer is regulating or resemblance to that of the near intensity of diffused van light, the more perfectly is the system adapted to the human organs of vision. The degree of the density of an illuminant can be judged with approximate accuracy by the degree of darkness of its shadow: and, judging from this standard, the naked are light is too intense, at least for and, purguing from one manners, one makes see right is too arcooms, on more or domestic and workshop purposes, as the shadows it produces are considerably darker than those of the light from the unclosed monday sun. This, of course, the density of the light can be reduced to any degree by the use of globes of glass of more or less oparity. This, however, is an expensive remedy, as a great percentage of the electrical energy is wastefully absorbed." (150)

ALBANY. A NEWSPAPER LIGHTED. We are installing a plant of one Z dynamo and 6ο Λ lamps in the newspaper and printing offices of the Press Company, publishers of the Dulle Press and Knitchecker.

BUFFALO, N. Y. ORAIN ELEVATOR LIGHTED. A plant of one L dynamo and 150 A lampe has been installed in the grain elevator of the New York, Lake Frie & Western Railway Company at Buffalo. The dynamo is driven by an 815 x 10 Lawrence engine. The disposition of the lamps is as 5 dlows.

Elevator	-				9
Receivin	g tower		*		2
Office					
Yanl					2

The lamps in the yard are placed in clusters of a each

An entirely new feature has been put in use in this elevator. The storage bins which are 60 teet in depth, have been fitted up with a portable Edison light arranged on an electric reel for lowering it to the bottom of the bin, thus enabling the workmen to ascertain if the hirs are empired.

ANOTHER STEAMSHIP TO BE LIGHTED. An order has been received by the London Edison Company for a plant of one L dynamo and 150 A lamps to light the new scanter "Adelaide," belonging to the Australian Steamship Company.

WATERVILLE, ME. OOTTON MILL PLANT INCREASED.
The Lockwood Company have been using a K dynamo and 250 A lights in their wave sloop during the past winter. They manufacture white shirtings and fancy cotton goods. Although they have gas works on their own premises, the use of our light during the

WASTEPULNESS OF O.A.S. Prof. S. P. Langley, Alleghusy Observatory, cale a paper before the Notional Academy of Sciences, Washington, April 2nds. showing the wastefulness of 800 km S. Taking the total amount of energy in a gas too. prof. Langley sates that only za parts of this perform says are stoon, Prof. Langley sates that only za parts of this perform says are stood of a gas part is wasted as compared with an ideal region of a gas plant is wasted as compared with an ideal region of a gas plant is wasted as compared with an ideal region of a gas plant is wasted as for the profession of the profession of spicial three should be no waste of energy. He paper has not been permed, but the following synopols apported in the New York Technon, April 1812.

"Prof. Langley's paper was "On the Spectrom of an Argand Gas-burner, and was illustrated by frequent reference to a large chart upon which curves produced by the rays of the sun and of an argund burner respectively, as shown in the spectrum. Profesor Langley's experiments were designed to ascertain the amount of energy which is in the form of light only by an argand horner; and for purposes of comparison he had subjected sunlight of equal intensity to like experiments. He showed by the curves on the chart that, of the energy expended to fill an area of, say, 1,000 parts, 976 parts lie outside of and beyond the visible spectrum, white only 24 parts fall within its limits; in other words, 976 parts of energy are wasted while only 24 parts performed service as light. Reduced to percentages, the waste energy is represented by 97 6-10, and the heat employed as light by 2 4-10. The same amount of or correy expended by the sun furnishes 34 per cent of light, and 66 per cent is waste. Taking everything into consideration, Professor Langley estimated that, putting the value of the gas plant of the country used in producing light at \$30,000,000, about 99 per cent. of it is wasted, as compared with an ideal light in the production of which there should be no waste of energy. An argand gas-barner uses in the form of light less than 1 per cent of the energy required for its production. The same process which would increase the quantity of light from a given degree of energy would also improve its qual2.1

FALL RIVER, MASS. OOTTON MILL TO BE LIGHTED, we have received an order for a plant of no H dynamos, and 650 A lamps to be installed in the Flint Milk, Fall River. We have received this order by reason of the axisfactory working of our light arth Connainer. King Fallin, and David Milk, where the light was seen in operation before the above plant for the Flint Milk was continued.

PALL RIVER, MASS. GOTTON MILL PLANT. A plint of one II dynama and 30 to Itump has been installed in the one II dynama and 30 to Itump has been installed in the allieng cotton goods. They former two collaments fars white shirtings and fancy cotton goods. They former two collaments fags, white shirtings and a wordy deposit not only on the walls and collings, but also on the collings were look, it was necessary to hurn gase in the waves shop-buding a greater part of the sky, and the smoke and bear of the ges evershould great disconfined to the waves. All those objectional delatures have now been currently the time of the 45 flows in the of the 25 flows in the collection.

LOUISVILLE EXPOSITION LIGHTED BY EDISON LAMPS.
We are now lighting the Southern Exposition, at Louisville, with
4.600 A lamps. This installation is so well described in the Lautwille
Ceurier-fournal of July 4th, that we reprint the following extracts

Courter-fournal of July 4th, that we reprint the following extract therefrom:

"The Machinery Committee of the Southern Exposition met yesterday

afternoon (July 30) at the building and signed the contract with the Ed-on Company for isolated Lighting, of Now Yudi. The contract is the largest that was ever made for lighting a building with neteric lights. The company agrees to light the building and gast lens with 4,600 Elden lights of I-focasile power each, is other work, the plant that will

Edition lights of 16-candle power each, in other words, the plant unit was he used will furnish more light than any other plant ever did. It will even be larger than the combined plant used at the great electric light exhibition at London last year.

Some idea of the undertaking may be gained when it is announced that the wire to be used would reach 40 miles in length if stretched out in a straight inte. The wire is all of cupper, and much of it is very thick. Its weight will be 40,000 pounds. The number of dynamo-machines will be fifteen, worth about \$4,000 cach. To run them will require four of the Armington & Sims regimes used by the Edisor Company.

The cost of the entire plant will be about processor, and in all regions; a close to one working containing from now until the cut of the month or string the value and the control as earlier to be a single plant with a single plant will be switched by a single plant with a single plant will be switched as the cut of the month of the plant will be equivalent to a gas plant assumfacturing, gione citied for plant have been lost the plant will be equivalent to a gas plant assumfacturing, gione citied for plant will be expected and furnished; but no not can ready comprehen bow much will be expected and furnished; but no not can ready comprehen bow much will be expected and furnished; but no not can ready comprehen bow much may be understood whether the convention are more to an interest, then it may be understood whether the exceedance and the convention are many for understood whether the convention are many for understood whether the convention are.

While the 4,000 langs are thought as a certific climate by experts well be in ble for ble fill for only the lighting company to be more than soft care in light the light between the place of the light leading the lighting between the control of t

The following extract is from the Louisville Courier-Journal, July 25th, and relates to an experimental trial of part of the plant_installed in the Louisville Exposition building:

and interesting."

"The engine that was set going returnly was an Armingianou & Shu, one of the engines could be effected fighting." The work of the Edition Company of the engines could be effected fighting. The work of the Edition Company was presently ready for two, and that the electric plant is sent as hard a could be in the little current could be tremed in the seven. Their engines worked as smoothly and anothering as an engine could work, and that frights were leastly as sometimes of the engine of the work. The engine worked as smoothly and anothering the engine could be ready and the engine could be right and the engine could regard sciential of no language could have been seen going; but as the enthibutes who are at work in the building of our plant was the work study, when the fallow for Company's or plant was not work study, when the fallow for Company of the work of the endings, when the fallow for Company of the work of the endings, when the fallow for Company of the could be endinged to the end of the country of the end of the country of the end of the country of the end of the

General Manager, say that the fight will be ready, in it is, infectly, cut may.

M. Noore and his achiental oberver growt credit her thing temporature in having the largest plant for electric lighting over half enalty even before the infect was required. It was a simplession substraking in place desiry solles of the contraction of the contracting plant of the contraction of the contracting plant of the largest plant of the contracting plant and the largest plant for other more appropriate forms of the contracting plants, which, then the supermore of an englar, regulator the contraction of characteristic plants, which, then they seemed far under the contraction of the contracting the contraction of the contracting large world bear an amount of their requisitor, if all that one of the large transition is plant world bear an amount of their requisitor, if all that one of the large transition is proposed to the contracting large world bear an entire transition of the contracting large world bear an entire transition of the contracting large more contracting to the contracting large contracting the contracting of the contracting large contracting to the contracting large contracting to the contracting large contracting to the contracting of the contractin

In the next Bulletin we hope to give a full report of the working and effect of this large plant during the progress of the Exposition.

LONDON, ENGLAND. THEATRE TO BE LIGHTED. The London Edition Company is installing a plant of four L dynamos and 6co A lange in the Criterion Theatre. Poesality, London, The wiring will be arranged on each circuits, each under independent control by means of a special regulator, capable of lowering or mising the lights to any testied literasty.

MILAN. PROGRESS OF CENTRAL GRATION. The Island Edition Company to be professed the Sime Endogress the state for its current seation, and has been for sometime installing the plant. This current seation, and has been for sometime installing the plant. This installation will will state already to seem in the plant of the Elions 1, 200-light dynamos, of which a love already been installed, and with which they have a state of the end of the plant on the plant of the plant

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We take the following extract from the Electrician, London, July 28th, relating to the starting of this station:

"On the 28th of June the Continety or in Applicance IIIal' Retirrical States Alizaria in Main Bais Imagurabal Heaves at nation of sections (Belling in Millia with a norise) in the Tearn Mancadi. The central station of Millia in Millia with a norise in the Tearn Mancadi. The contact station of Millia has two from IIIal's Image and the same right in the Contact of the State of the

PRAGUE. THEATRE TO BE LIGHTED. The National Theatre, now being constructed at Pragme, the capital of Bohemia, will be lighted by the Edison system. The plant will consist of one Z and seven K dynamos and about 2,000 A Jamps.

MUNIOR. BREWERY LIGHTED. An installation of 40 A and 40 B lamps with a Z dynamo has been in operation for six months in the brewery De la Croix d'or, Munich. The plant is in use every day from 6 o'clock in the evening till 2 o'clock in the morning.

CÖSWIG, GERMANY. PAPER FACTORY LIGHTED. A plant of one Z dynamo and 60 A lumps has been installed in a paper factory at Coswig, Germany.

TRIESTE. AUSTRIA. MAN-OF-WAR LIGHTED. An installation of one 1, dynamo and 150 A lumps has been made on a man-of-war belonging to the Austrian Government.

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THE EDISON LIGHT AT THE CLANS CORONATION. We mentioned in the last Bulletin that on the excasion of the Carris coronation at Moscow, the Kremlin was illuminated with 3,500 Edison lamps. We now give the following extracts from the St. Petershour Levels, referring to this lighting:

"The Illumination that took place on the day of the cromation drew the uniter population of Moscow into the street, spaticitarly in the vicinity of the Kremlin. Everybody waterd to see the Illumination which was so much read and liked about five works and which though urgan anything billution seen; and ready this Illumination presented a great and hemopratule aspect. The time forement of water the street of the Illumination of the street of Illumination of which we will fertile a wage remembrance."

The journal News Wrems says:

"Iwan the Great, fully illuminated with Elison lamps, presented a truly magic aspect."

SPAIN. ARSENAL LIGHTED. The Spanish Government has given an order for an Edison plant consisting of two L dynamos, with 171 A and 250 B lamps, to light the Arsenal de la Carraca, Stutin.

BERLIN. A THEATRE TO BE LIGHTED. The new Deutches Theater, Berlin, is to be lighted by Edison lamps. The contract between the directors of the theatre and the German Edison Company has been signed.

BERLIN. RESTAURANT LIGHTED. The rooms of the restaurant at the Exposition Hygiénique, Berlin, are lighted by 250 A lamps.

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NEUWIED, OERMANY. TOBAOOO FACTORY PLANT. The tobacco factory of Mr. J. P. Schneider, at Neuwied, has been lighted by a plant of 28 B Jamps almost a year, and the light has given such satisfaction that the plant is to be increased.

CAEN, FRANCE. EXPOSITION LIGHTED. The exposition at Caen, which was opened on the 5th of June, is entirely lighted by the Edison light. There are upwards of 300 Jamps placed in the various galleries and through the walks

COGNAC, FRANCE. CAFÉ LIGHTED. A plant of one E dynamo 17 A lamps, has been installed in the Café du Châlet, at Cognac. This plant has been in operation since May 22th.

OCGNAC, FRANCE. DISTILLERY PLANT. An installation of one Z dynamo and 65 A lamps has been placed in the distillery of Mr. Gravelles, Cognac, France.

ANNONAY, FRANCE. FACTORY AND RESIDENCE LIGHT-ED. A plant of one Z dynamo and 60 A lamps has been installed at Annonay, for Mr. Jonaron, to light his leather factory and residence.

RAUKJIONNES, FRANCE. HOTEL FLANT. A small plant of 17 Å lamps with as E dynamo livs been issailed in the Hosel-de-France, East-Homes. Mr. Taverne, the proprietor of the hotel, desired a So-light plant, but had not sufficient power at this disposal to drive that size of dynamo. The light gives great sufficient, particularly in the dishing room, where the absence of heat its particularly in the dishing room.

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VOIRON, FRANCE. PAPER FACTORY LIGHTED. An installation of one E dynamo, 18 B and 3 A lamps, has been in operation in the paper factory of Messrs, de Guérimand & Co., at Voiron, since April and has given great satisfaction.

ROUBAIX, FRANCE. WOOLEN MILL PLANT. There has been installed in the mill of Messes. Amélde Pronvost & Co., manufacturers of woolen goods, a plant of one L dynamo and 150 A

PARIS. BOXDED WAREHOUSE LIGHTED. An installation of one K dynamo, with 300 A and B lamps, has been made in the honded warehouse on the quay Saint-Bernard, Paris. Not only is light farmished, but electric power from the plant is used throughout the various departments.

CREFELD, GERMANY. PAINT FACTORY PLANT. A small plant of 47 A and B lamps has been installed in the paint factory of Mr. II. O. Neuhaus at Crefeld. The light enables the worknen to mix colors as well at night as by daylight.

ESSONNES, FRANCE. PAPER MILL PLANT INCREAS-ED. Messrs. Darbly & Hernger, who had an installation of one Z dynamo, 60 A lamps, placed in their paper factory list February, have ordered a second installation of another Z dynamo and 60 A lambs.

RIVES, FRANCE. PAPER FACTORY LIGHTED. Messrs. Blanchet & Kléber, manufacturers of photographic paper, have an Edison plant of one Z dynamo, 29 A and 36 B lamps, installed in their factors at Rives.

tyf:

IVRY-8UR-SEINE, FRANCE. SMALLPLANT. A plant of one E dynamo and 17 A lamps has been installed in the foundry of M. Lemoine, Ivry-Sur-Seine, for lighting his offices.

BORDEAUX. OIL MANUFACTORY LIGHTED. A plant of one L dynamo has been insulled in the oil manufactory of Meessx. Maurel & Prom and Maurel Bruthers: At present only 88 A lamps are placed in position, but the whole musber, 150, will be used when some additions to the factory are commission.

LONDON, ENGLAND. LARGE RESTAURANT WIRED. The premises of Mesos. Gani, ressurant. Strand, Joudon, are being wired by the Edison Company there for goo lamps. These lamps will be supplied with current from a central station which it. Is proposed to establish to light that district.

NEW ZEALAND. GOVERNMENT OFFICES LIGHTED.
The Government Printing Offices at Wellington, New Zealand, are now lighted by an Edison plant of one Z dynamo and 40 A lamps.

MELBOURNE AUSTRALIA. The Victoria House of Assembly at Melbourne, is Eghted with an Edison plant, consisting of one Z dynamo and 40 A lamps,

BRISBANE, QUEENSLAND. GOVERNMENT BUILDINGS LIGHTED. A plant of two dynamos and 350 A lamps has been installed in the Queensland Parliamentary Insiddings, and the Queensland Government Printing Offices, at Ilrisbane, Queensland.

PUBLISHED TESTS OF EDISON LAMPS AND DYNAMOS.
The following letter may be of interest as containing a record of the principal published tests of the Edison dynamo and lamps:

"New York, August 13th, 1883.

E. H. Talbot, Esq., Sec'y.

NATIONAL EXPOSITION OF RAILWAY APPLIANCES,

Chicago, III.

Data Stat.—As to whether the Elbini Company had leaver go in the copiese and Tradels of briving a set made of a superman exclassional at the Endlowy Expendition, see English on your had several well-known into the control Elbino organization and the Elbini organization and the Elbini organization and the Elbini organization and the Elbinio organization and an advantagement conductors and metry. Mr. Elbinio organization by metant of anticogramed conductors and metry. Mr. Elbinio organization by metant of anticogramed conductors and metry. Mr. Elbinio organization and anticogramed conductors and metry. Mr. Elbinio organization and conductors and metry.

 Report upon the comparative efficiency of the Edison dynamo, by Professors C. P. Brackett and C. A. Young, of the College of New Jersey, Princeton, published in the Scientific American, May 15th, 1850.

(2) Report of Mr. John W. Howell, of the Stevens Institute of Technology, Hoboken, on his test of the Edison dynamo, lamps and conductors, published in Van Nottrand's Engineering Magazine, January, 1882.

(3). Report of the Suli-Commission on incareloccut Limps, made to the President of the Experiment-Commission of the Jury of the International Exhibition of Electricity, Paris, printed in the London Electrician, June 17th, 1882.

(1) A paper presented to the Frenck Academy, Park, dated November 2018, 1883, by the number of the Experiment Commont of the large to the latest the Experiment Commont of the University of the Experiment Common of the Commission of Experiment, paging the results of their text on the Experiment Common of Experiment, and the Experiment Commission of their text of the Experiment Common of Experiment Common o

the above date.

These reputs show that as regards the Edison dynamo there is but a slight
difference between its working efficiency and theoretical perfection, and that
as regards the Edison lamps, those manufactured by our Company are
sumerior to the same as made by any other company.

Although Mr. Edison has improved his dynamic, and more especially the lamp, three these reports were made, nevertheles, we are willing to abide by these as correctly stating the efficiency of our apparatus, both for connected and competitive purposes.

Respectfully yours,

THE EDRON BLEICIRG LIGHT COMPANY, By S. B. Evron, President."

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The following are extracts from Lieut Schroeder's report:

¹⁰ There are 136 Edison incandescent lamps in place on board this vessel, of that number, under ordinary circumviances 40 to 45 are generally in operation the greater part of every evening, beginning at dark and ending at about 11 P. M.

During the quarter ending March 31st, 1883, eighteen lamps have been disabled, as follows:

- 10 Broken in handling.
- 4 Bornest ent.
- Burned out by short circuiting of two branch wires.
 Gradually unscrewed from socket, owing to vibra-
- tion of holl, and fell on deck, breaking the glass and filament,
- t Carlson filament broken by caulking the deck above.
- t Carbon filament broken while experimenting.

The invoice price of each lamp being one dollar, the additional cost of illumination on account of breakage of lamps has been \$18.00, over and alone first cost of plant.

During the quarter the dynamo-machine has run 540 hours. Of the 136 lamps in position 34 have been in operation the whole thire, or 540 hours each at 18,360 hours in all, of the remainder, the hours of incandescence have been as follows:

```
2 --- 440 hours each ---
                     880 hours
 4---410 "
                  = 1.640
22 -- 340
                  = 7.480
8 - 100
                       800
20 -- 50
                  1,000
18 -- 10
                      180
                  = 11,080
34 - - 540
                  m 18,360
                  = 30,340
```

.

The running expense in lamps nas therefore been $\frac{50.50}{30.50} = 59$ one thorasandths of a cent per lamp in operation per beer. For illuminating the rather vessel the running expense in lamps has been $\frac{510}{540} = 335$ cents per

The life of the lamps that have burned out has been as follows:
No. 49 (8-candle power) 92 hours.

- A mean of these would obviously be a very undir showing of the average life of the Edison lamp. The imperfect ones give way first, and a correct average, of course, can only be had by waiting to consider the best as well as

use of the Johnson Barille. The majorefect ones give way have, and a correct warrage, of course, cauming local by warring to contrict the best as well as the powers. It is only fair also to add that the lenskage by accident has been greater than will probably containe to be the cise, the effect where the extensely raw, given and undistiding; in handling the anys, tropusedly widoot authority, they have apparently now almost feet, as a radi, and less desired that the contribution of the contribution of the contribution of the little with the light will helidated secretors this owner of equation this little with the light will helidated secretors this owner of equation that

Furthermore, the lamp that was distilled by entitling conclusal, we preperly fit in place to ten baselyme there to conflict in the face, that the sale interaction of the face that was long canilled; the burning of one by short-deciming to conclude face the familiation of the yearn was complete, and restude from the lower ends of two forms the face ends of two fears do wires coming in contact; the obstruction of a third occurred during, and was apparation greated by some experiment which proved an adoremal conflicts for an enablescent system of filaminates. As shown above, only four of the eighteen taker human day, which would

reduce the legitimate running expense to $30^{11}_{10} = 13$ one-dimensionables of a cent per lamp in operation per hour, or $\frac{1}{110} = 71$ one handredths of a cent per hour for lighting the vessel.

Some of the globes have begun to be alt-coloured by the wasting of the filaments (Grote's effect), but not sufficiently to affect sensibly the amount of light given out.

Apart from questions of economy, the light comments itself strongly for use un ship-board. Its chief salvantages over the meant of illumination in common use afoat, are:

 The absence of heat, moke, smell and dirt, and the non-consumption of oxygen;—important points at all times and repectally in had weather when hatches are closed.

 The almost absolute immunity from danger of tre; even in cases of short-circuiting or arcing between two branch-wires, which are the only ones

1,93

3. The great convenience of having it ready to turn on m any place, including the magazine passage, holds or store-rooms, where otherwise an off turn would have to be used with its peculiar characteristics of disuress, dist and danger.

4- Its ability to remain in uperation under water, when it may frequently be useful in examining or repairing a whip's bottom, or cleaning a hawser from the propeller at alght. It is likewise unaffected by rain or wind. The sendiness of the light and its solutions combine to make it most agree.

able to the execution of organization and assumes contained to make it most agreed, and the first execution of the execution

The bertholeck of the vessel is 42 feet long, 23 feet average breadth, and 8 feet high. It is lighted by six Scandle lamps, three on each ade. They diluminate it throughly, so that the numbers on the large or hammocks can be read with perfect facility in any part or in any position.

The fore hold has, on the after bulk-head, one 8-casalle lamp on each side, with this reflectors. By the hight of one of them, any piece of goar or object of any kind on the same side of the hold, can be immediately recognized throughout its length (25 feet), and could easily be picked out at a greater distance.

Throughout the entire vessel, the efficiency of the illumination is the same, and is a great source of convenience and confort to all serving on loard,

The greet convenience of the pentable load and a land langu seed not lee weighed peny, as that it the save or sub-based a ran a bane. Once, if it, it can be proved to the pental seed of the case of the pental seed of the case of the pental seed of the pental s

The following extracts are from Engineer Baird's report, above

"The communy of the follow intends-event system of lighting is a question of commercial as well as engineering inspirators, and as this is the first U.S. Sup to utilize this important in vention. I have considered it necessary to make more than the usual test of the markinery, that we may obtain figures which will enable the Commissioner to judge instilligently as to its read and cummanative value.

The Hard consists, fast, of an englas of the Armignous and Sian reads, which as single given of 50 ja lines, changes of loce and a strake of platter of 10 pixels. Attended to 50 jacks, a single point of 50 jacks, a sounded on a pick and for the facts. The englise is benfrontal, is montred on a pick and for the particular and have a confining algorature in the 50 section, for special contents of the 50 section, and the content of the content of the single point of the fact of the content of the fact of the content of the cont

ting polition the relevant control recognition in agents wereful, the remainstrative recoding in the relevant the anguest, the theoristic remarks recoding in the relevant the anguest, that has been correct. A relevant to the recognition of the suspectic field with recipitate the present read, by a desired present read, by a desired present read, by a desired present read of the family as exactle to havered a placeau. The object of this method to to obtain the result of the family as a resulted before the part of the family as the relavant to the result result is a result of the result of the result of the result of the result is a result of the relaxation of the follows result of the result of

and the field a recisioner most be withheld in to ballow it.
Thick, there are it by eight canding-your Blangs of by olons revisioned code, justed in autility are, can be offered by the property of the prope

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National plant? for "safety careta," which commains a stort piece of fusible alloys the relice of this play is two-field; it may be even at a piece of the safety where one of the circuit at placaurer, and also to prevent the safety of the legyond the faining point of the alloy (see degrees), this rendering the safety harmless as a fire agent. These 'cut-out's are essential as the copper when would, in even of a short circuit, need and set fire to codpare when

The absolute safety of the Edison system, against himy to human life, commends it very highly. The low pressure of 51 volts is heofficient to pass through a man's body and can, therefore, never injure him.

MANNER OF MAKING THE EXPERIMENTS.

By means of a steam-engine indicator I measured the power required to must be engine and dynamo, the current being switched off. By the same interment I may be a supplementary of the supplementary of the supplementary of the strumont I may be a supplementary of the supplementary of the supplementary of the large, respectively. The supplementary of the supplement

DISTRIBUTION OF THE POWER.

Power required to rou the engine and dynamo	3.56
Indicated horse-power required to run 45 incandescent lamps	
Indicated horse power required to run 50 lucandescent lange.	5.79
to the angle of the parter to run 50 incamblescent lamps	5.85
Indicated horse power required to run 70 incandescent lamps	6.02
Net horse-power applied to the revolution of the armature in the mag-	
netic field, using 45 incandescent lamps	1.50
Net horse-power applied to the revolution of the armature in the mag-	1.00
artic field, using to become terminan of the armature in the mag-	

Net horse-power applied to the revolution of the armature in the magnetic field, using 70 incandescent lamps 2.84 Mean number of incandescent lamps per indicated H.P. using 4.5 lamps 2.72

Mean musher of hreatdecent lamps per indicated 11.P. using 45 lamps 7.77
Mean number of incundencent lamps per indicated 11.P. using 2 lamps 8.50
Mean number of incundencent lamps per indicated 11.P. using 26 lamps 8.50
Mean number of incundencent lamps per indicated 11.P. using 45 lamps 25.
Mean number of incundencent lamps per int 11.P. using 50 lamps 27,00
Mean number of incundencent lamps per int 11.P. using 50 lamps 27,00
Mean number of incundencent lamps per int 11.P. using 50 lamps 27,00
Mean number of incundencent lamps per int 11.P. using 50 lamps 27,00
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Mean number of incundencent lamps per indicated 11.P. using 50 lamps 27,00
Mean number of incundencent lamps 27,00
Mean number of incu

Mean number of incandescent lamps per set 11. P. using 70 lamps 24.63. The wires being fixed, their resistance may be considered a constant quantity and the only variables a existing in the engine and alyamano; the distribution of the power, as above recorded may, if necessary, is verified by electrical measurements on the wires.

RELATIVE ECONOMY OF THE LAMPS.

The cost of running the incandescent lamps, as compared with coal gas lighting is a matter of commercial as well as engineering interest, and it is my purpose to confine the comparison to these objects allow. From the quantities determined and recorded above, these comparisons are made, candlepower for candle-power.

So far the greatest number of langes in operation at one three has been 70; we ordinarily use from 45 to 50. The number of lamps per indicated horse-power increases with the number of lamps used, for the reason that the engine works more economically at higher powers.

The comparison between these fiscandescent lumps and light from coal ga, as incasared by a phosimeter, is not a fit one, inasamed as the gas binner is ided (to say robling of part of the fisture) is under the jet and cast a shadow undermeath, while the Dilvo lamps are inverted and the shadow is abused as one of the part of the sales. As the light based onder the lamps a larger prevenge of light from the inverted fasture will be cast upon the work beneath, and for this the docounter makes to ne reduction.

Although the B circuit is installed to give S candle power lamps they really entit about 10, which is also an unhalanced account in tavor of the electric lamps.

where $M_{\rm c} = 0.00$ is could at a lone power developed by the dyname napice has the carried a by a classifing the mental of some a more if therein explaints, and releasing this to possible of water and distilling the type possible and the could be supported by the possible of the could be a supported by the possible of the could be a supported by the possible of the could be a supported by the possible of the could be a supported by the possible of the could be a supported by the could be a suppor

The coal gas company of Washington supplies gas of 15 candlas power, used from a 4 foot bat-wing burner, at \$1,73 tor thousand cubic feet. The cost of such a jet of gas then becomes (1,kkll*,)=0.0041176 cross per candlepower per hour, or a little over three sines what the Edison incundescent likely is costing use to beard this tiple.

again at cooling in set to offer the cost of labor and the interest on the innersy in invested in the plant as we have no additional near for remaining the dynamo non engine, the officer on watch attenting to it is addition to all whether the The interest on the plant at aix per cent. Is only $(933000 \cos 600)$ \$2100. We see along to plantapa about at tho may a day, so that the interest on the insurlavated it about $\frac{1}{16}$ of a cent per candile-power per hour, or liardly worth considering."

. .

DEATHS FROM GAS. On February 5th, Henry Shaw, white making a connection between the main pipe of the West Manayunk Gas Company, and Dowells' paper mill, Manayunk, Pa., was overcome by escaping gas, and died in less than ten minutes. . . . On February 8th, a gasoline machine, in the restaurant of A J. Smith, on Market Square, Norfolk, Va., exploded, wrecking the place completely. R. Pinner was killed, and five others injured. * * * W. S. Lawrance was found dead in bed at the Putnam House, Fourth Avenue and 26th Street, New York City, March, 1st, having been suffocated by illuminating gas with which the room was filled. * * * Mrs. Hannah R. Johnson was found dead in bed March 15th, at 215 Graham Avenue, Brooklyn, N. V., laving been suffocated by escaping gas. * * * On March 17th, Luther Tucker was found suffocated to death by gas in the Kinsball House, Dover, Mass, * * * William Mulcahy, of No. 1,435 Filbert Street, Philadelphia, was found sufficiated by gas in his room at the Brooklyn Bridge Hotel, No. 48 Chatham Street, March 17th. . . . Mrs. Barty was found insensible in bed at her home in Halifax, England, March 22d, the room being filled with escaping gas. She died five days afterwards. * * * On April 4th, an explosion, caused by escaping gas, occurred in Bond Street, Boston. The immediate neighborhood was shaken as if by an earthquake, and a dull rumbling noise accompanied the shock, which was felt in some directions for more than half a mile. The streets in the vicinity were torn up by the explosion, and couble stones buried through windows on the third story of some of the houses on Bond Street. Two children were killed. * * * Lizzie Hoag, of No. 200 West 57th Street, New York, was found in bed April 6th unconscious, the room being filled with gas which was escaping from the hurner. She was removed to the hospital, where she died the next day. . . . Emanuel Miller was found dead in his room, No. 313 West 23d Street, New York City, May 4th. The

room was filled with gas which was ecapitar from an open hurner, is "O Mby at the N. Co. Kolle was from all dual in he line in some at the Northern Central Hood, Baltimore, having been safforence level by Illeminating gas which was excepting from an open time to the the new attention of the safforence of the safforence was the safforence of the saffore

DANGER FROM GAS. A gas meter in the house of Thomas Quinn, 512 Queen Street, Philadelphia, exploded March 28th, causing a fire. * * * A fire occurred at 13* Bedford Avenue, Brooklyn, April 5, caused by a curtain coming in contact with a lighted gas jet. * * * On April 6th a fire was caused by a gas jet at 240 West 59th Street, New York. * * * A series of gas explosions, some of them very dangerous, occurred at Walsden, England, April 6th. A large steam road-roller had injured some of the Gas Company's mains, so that gas escaped. The gas afterwards ignited. It also got into houses, and for about four hours there was a continual occurrence of explosions. Occupiers of houses had to but out their fires and get out of the way. Considerable damage was done to property, and the gas had to be turned off at the works before all was deemed safe. * * * A leaky gas pipe was the cause of a fire on April 9th, at 640 East 13th Street, New York. * * * On April 13th a series of violent explosions occurred in the cast basement of the Palace Hotel, San Francisco, which were followed by a volume of flame pouring into the street from the place in the sidewalk where light was admitted into the want through plates of thick glass. The cause of these explosions was the breaking in two of an eight inch gas main while some plumbers were connecting a pipe with the 1,500 light gas meter which had just been placed in position. The escap-

No. 20.

ing as had ignited and esploided with grant force, shattering to amous the third ghas plates over the want. Part of the meter, which was of fluxe-equator med iton, was also hown to figaments. The volume of flame from the ignited gas was very great, and lust for the prompt action of the fremen, would prohably have done great damage to the hord. Tweny-four persons were injured, most of them habily, and three of four dangerously. ** Fire excarred at 199 Grand Steet, Brooklyn, on April 15th, from some clustings that the prompt of the property of the proper

THE Edison Electric Light Company 45 FIFTH AVENUE, NEW YORK.

October 31st, 1883.

(These bulleths, originally issued as a coversion way of answring the implicits obsolute agents, are now, in response to numerous respects, sent also to all stock-bolders, to give them submassion of the propers of the Company and of other nations of greater or less interest connected with electric lighting. Agents are particularly requested to communicate to the President Averer perical point of greaters instead to communicate to the President Averer perical point of great instead in the Company of the Company

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and the second s	

FIRST DISTRICT, NEW YORK CITY. This plant is now in its fourteenth month of continuous running. We are at present lighting 508 houses, wired for 12,732 lamps, of which 10,164 are actually attached to the conductors, available at will. From the first, the number of consumers has steadily increased, month by month, as appears by the following statement showing the number of customers and lamps at the beginning of each month, since the station was first started:

DATE.	NUMBER OF CONSUMERS.	LAMPS IN USE.	WIRED FO		
October 1st, 1882	59 Customers	1,284	1,626		
November 1st, 1882	94 "	1,704	2,468		
December 1st, 1882	203 #	· 1,144	4,838		
January 1st, 1883	231 "	3-477	5,328		
February 1st, 1883	302 "	4,131	6,161		
March 1st, 1883	324 "	4:331	6,596		
April 1st, 1883	361 "	4,884	7,871		
May 1st, 1883	386 "	5,574	8,581		
June 1st, 1883	410 . #	6,466	10,268		
July 1st, 1883	436* "	7,429	10,350		
August 1st, 1883	443" "	7,946	10,920		
September 1st, 1883	455 -1	8,218	11,192		
Octuber 1st, 1883	472 "	8,573	11,555		
October 27th, 1881	108 "	10,164	12,732		

It may interest our stockholders to know who are the principal customers using our light in the First District, supplied by means of the underground confluctors from the Pearl Street Station. The following list embraces some of the best known names:

			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- 11000
NAM			ADDRESS.	No. or
Third National Ita	nk			
				50
				72
				27
Kidder, Peabody 2	· Co		1 Nassau Street	103
				40
Merchants' Bank.	of Cana	da	61 Wall Street	54
New York Safe De	nodi C		140 Broadway.	6
Chatham National	Bank		196 Broadway	80
Continental Bank			5 Nassau Street	43
Laidlan & Co			14 Wall Street	43
Brown Brothers &	ċ		59 " "	16
Leather Manufactu	D		29 " "	59
Bank of Montered			29 " "	31
No Be Mascantile	la		59 " " 50 William Street	15
Citizen's	or dram	ee Co.	50 William Street	57
National			156 Itmadway.	13
New York Fire				5
Guardian				7.
Standard				31
Loudon Fire			52 Wall Street	14
London & Prov.			50 William Street	13
Son Metual			31 Pine Street	11
Norwich Union				26
Boston Marine			67 Wall Street	23
Manhattan Life			41	23
Niagara			156 Broadway	20
Continental				30
Knickerbocker			102 "	129
Great Western			64 Wall Street	6
Commercial Union			50 " "	14
Lancashire			37 " "	26
Exchange			40 Pine Street	23
Home			40 " "	15
Royal			119 Hroadway	146
Trong Atlantic			50 Wall Street	46

NAME.	ADDRESS.	No. of
N. Y. Mining Stock & Petroleum I	is 60 Broadway	- 44
New York Stock Exchange	Broad Street	247
U. S. Assay Office	12 Wall Street	- 23
		112
Times	Park Row	- 0
Commercial Advertiser	So Naman Street	124
		40
Sun.	Printing House Sauce	93
Truth	. 8 Sprace Street	13
		68
		33
		13
		68
C. A. Cheever	21 Park Row.	400
		So
Berlin & Jones Envelope Co	134 William Street	225
Dancas Building	Pine and Nassau Streets	400
Henry Clews & Co.	18 New Street	18
F. W. Dense & Co.	tot Folton Street	46
Spencer Trask & Co.	To Broadway	
Maurice Daly	70 Broadway 258 Pearl Street	23
		24
Third Ave., E. R. R. Station	l'ulton Street.	24
Felter & Merrigold	260 Pearl Street	84
S. W. Green & Son	74 Beekman Street	
Timelver Rubber Co.	57 Maiden Lane.	49
D. H. Houghtaling	142 Front Street	15
Indson Printer Co.	16 Beekman Street	41
Hierina & Cox	50 Wall Street	43
Howard Insurance Co	66 tr 11	37
Iselm & Warner	and then	17
Keuffel & Esser	127 Fulton Street	39
Mark Mayer	100 "	20
National Tule Works	100	67
New Harm Street Co.	Pier 25, E. R.	28
American Best No. (1)	140 limadway	43
A. M. Sweet & Son	140 Ilroadway	88
Williams C. C.	6 Fulton Street.	357
Silleck & Co	98	73
Shannon, Moller & Crane	40 Manien Lane	29
174H. Store & Co	119 William Street	28
W. H. Scheifflin & Co	170 " "	146

	MINIMAG.	LAMPS.
Union Stove Works	70 Beekman Street	76
Vermilye & Co	. 16 Nassau Street	21
Washburn & Moen Mfg Co	t6 Cliff Street	20
Waterleary Watch Co	52 Maiden Lauc	tá
Winslow, Lanier & Co	26 Navau Street	20
D. Wallerstein	174 William Street	21
Ira Perego	Nassan & Fulton Street	16
Richard Kolls	164 Pearl Street	40
London & Laucashire Ins. Co	46 Pine Street.	41
Nassau Bank Vanha	Nawau & Heekman	41
Richardson, Boynton & Co	232 Water Street	38
M. V. Catde	141 Fultou Street	46
German American Insurance Co.	119 Broadway	55

. THE SECTION STREET

ADDRESS

18

. . | 23 Wall Street Northwestern Fire Insurance Co., Park Row . The subject of increasing the capacity of the Pearl Street Station is already under discussion, the demand for the light being in excess of our present facilities for supplying it.

166 Hrundway

N. Y. Belting & Packing Co..... 15 Park Row . . .

Empire husurance Co.

Dread Building.....

BOSTON. FOREIGN EXHIBITION LIGHTED. We are now lighting, under contract, the Foreign Exhibition at Boston. The plant consists of three 11 dynamos, each of 100 lights capacity, driven by an Armington & Sins engine. The building is wired for about t.050 lamps, of which t,030 are of sixteen candles, 20 of cieht candles, and 10 of fifty candles each.

We take the following extracts from the Manufacturers' Gazette. Boston, September 15th, regarding this plant:

"The disposition of the lamps in the Fureign Exhibition building is as follows :

In the Restaurant Vendome three 50-candle and forty-six 16-candle lamps, sixty-six in Washington Hall, 228 of the same in the main hall, 184 in the main art gallery, forty-five in the water-color gallery and eighty-one in the (ant)

four in the main corridor, offices, ladies' parlor, etc., with the balance scatte around in the small risins * * *. An automatic regulator equipped with two Fallson lamps regulates perfectly the volume of the lights on the circuits, Irrespective not only of the speed of the engine, but also of the number of lamps in circuit. . . . Save in the art galleries, where the lights extend along semi-circular tin reflectors, the lamps are set in many rich and tasteful brackets and electrolier designs, made by Bergmann & Co., New York, manufacturers to the Edison Company of lamp fixtures and appliances. In the rotunda of the business entrance is an umbrella effect, as it is called, which consists of a 50candle lamp suspended from a porcelain fixed umbrells, with eight 16-candle power lamps ranged around and slightly above it, while the main corridor is fairly ablase with soft, steady, mellow, yet brilliant light. The elegantly appointed and conveniently arranged press to on is also fitted with the Edison light which is thoroughly appreciated by the scribes. Restaurant Vendome presents a very pleasing appearance, with its numerous Japanese authorities and Chusese lanterns, interspersed as they are with the electric light, among which are three numbrella effects. On the grand staircase to the main hall are two Newell-post fixtures with four Edison lamps. A unique feature of the Edison Company's display is the arrangement of its office quarters in Franklin Hall in tront of Restaurant Vendome . . . Suspended over the desk in the office is an innorme Japanese umbrella, projecting from whose rib tips are twenty B or 8-camble power lamps, which are equivalent to ten 16-camble lights. Depending from the umbrella handle, and four or five feet above the desk, is a Bergmann artificial flower electrolier, with nine 16 candle lamps wreathed in among the flowers in vari-colored bell-shaped shades. The flower globe is of white glazed porcelain, rising from which is a shaft of gold colored gas plying an inch in diameter, which was substituted for the uninella handle below the braces, and the whole setting is decidedly artistic. Inserted in the floor, just inside the knee-hole of the desk, are two switches worked by the feet, the right-hand switch turning on or off the current to the rib-tip lamps, and the left hand one performing the same office for the electrolic lights, the extinguishing being done by the pressing out of a spring, and the lighting by pushing in a metallic button. The effect is magical, and a source of great wonder to the uninitiated. Several feet to the right of the desk, but in the same circuit with the umbrella lights, and affixed to one of the sprights of the building, is an ingenious electric cigar lighter, devised by Mr. Edison. The connection is made by grasping the handle of the lighter, the bars of platinum wire therein glowing with a bright red heat sufficient to ignite eigars and eigarettes; the current is broken by releasing the lighter. The setting and workings of the light at the Edison office form one of the most attractive sights of the exposition, as is evidenced by the number of interested visitors who find themselves in this quarter, and me might fairly emisider himself an occupant of Aladdin's palace, so wonderful are the workings of the system.

antique roun, China court twenty-right, eighteen in the Irish kitchen, eighty-

PHILADELPHIA. LARGE DRY GOODS STORE PLANT. We have received an order from Messrs. Darlington, Runk & Co., Philadelphia, for a plant of two dynamos, 400 Å lamps, to light their dry goods store. These lamps will replace llrush are lights, which were found unsatisfactors.

THEST PRIZES FOR THE EDISON EXHIBIT AT OIMCHINAET. The Jury appointed by the Commissioners of the Circimal Exposition to report upon the subject of Electric Lights, consisted of Poof. To. C. Mendenhall, Claiman, Professor of Physics of
the Ohio Stage University, Columbus, Ohio, Prof. II. T. Eddy,
Prof. Thomas French, Professor of Physics, Cacimanti University;
Prof. Thomas French, Professor of Physics, Cacimanti University;
rand Mr. Robert Laidilaw, a mechanical expert convexed with
the extablishment of Mesrs. Lane, Bodley & Co., Cincinnati. The
tree transport of the Professor of Physics, Cacimanti University;
Electric Lighting; also a gold media, for the best Incandescent
Electric Lighting; also a gold media, for the best Incandescent
Electric Lighting is not the first pixte for no Incandescent Lamp
Dynamo, were awarded to the Edison Company, being all the prizes
they connected for

The first prize for the best System of Arc Lighting, and the first prize for the best Arc Light Lamp were awarded to the Thomson-Houston Company. The United States Electric Lighting Company, with the Weston are light and the Maxim incandescent lamp (an infringement on the Edilson lamp) stood second.

The full text of the Jury's Report, not yet issued, will be published in a future number of the Hulletin.

SALEM, MASS. OOTTON MILL TO BE LIGHTED. We are installing in the Naumkeag Mills, at Salem, Mass., a plant consisting of two dynamos and 500 Å lamps.

PALL RIVER, MASS, ANOTHER OUTON MILL PLANT, We have insuled a plant of one "I dynamo and top A thmys, in the weaver-tooms and offices of the Monnup Mill, Fall River, Mass. At this mill they mandacture duck of a very heavy quality in dark indigo, olive and thues, and found it difficult to get light enough from the gas manufactured untel premises. By placing one if candle-power lamp between two looms we have succeeded in giving them ample light for their purposes.

COTTON MILL PLANT. CORRECTION. In the 19th Bulletin we mentioned that a plant had been ordered by the National Manufacturing Company, and we stated by mistake that the location of that Company was Augusta, Ga. The correct address of the National Manufacturing Company is Nashville, Tean.

CONTRACTS CLOSED BY THE WESTERN EDISON COM-PANY. Since the last Bulletin, contracts for the following plants have been closed by the Western Edison Light Company:

- (1.) A plant of one Z dynamo, 60 A lamps, for the State Institute for the Education of the Deaf and Dumb, at Jacksonville, 1tl.
- (2.) A plant of one L dynamo, 300 B lamps, for the Western Nail Co., Belleville, III.
- (3.) A plant of one Z dynamo and 60 A lamps for the sawnill of the Anson Eldred Lumber & Manufacturing Co., at Fort Howard, Wisconsin.
- (4.) A plant of an L dynamo, and 174 A lamps, to be installed in the packing houses of the Chicago Packing & Provision Co., at the Union Stock Yards, Chicago, Ill.

A 10

(5.) A plant of one II dynamo, 400 A lights, to be installed in the iron working alongs of the Chicago, Milwaukee & St. Paul R. R. Cn. at Milwaukee, Wis. This Edison plant will superseid Weston are lights, which have heretofore been used at these shops. The Western Edison Light Co., lave also wired Mr. Edson

Keith's residence in Chicago, for 191 A lamps, to be connected with the plant supplying light to Mr. Doane's residence.

They are also wiring Gen. Anson Stager's residence, in Chicago, formerly occupied by the Calumet Club, for about 150 lights.

AGAINST STORAGE BATTERIES. The following extract about storage hatteries is taken from the New Haven Register, October 3d:

'No one in this country has a more profound knowledge of the applications of electricity than Edison, and whenever he speaks on the subject his opinion is worthy of great attention. No one needs some mode of electrical storage more than he. At his lighting station on Pearl street, New Yorkthe largest in the world-those immense engines are required to run all day, so that some customer may be able to light a dark cellar or turn on an occasional light. A method of storage would here come in admirably, and the Edison company stands ready to pay a very large sum for a practical apparatus. In 1879, Edbon took out patents in this direction, and to day this is what he thinks of storage batteries. 'The storage battery is in my opinion a catch-penny, a sensation, a methanism for swindling by stock companies. The storage battery is one of those peculiar things which appeal to the imagination, and no more perfect thing could be devised by stock swindlers than that very selfsame thing. The same swindle which it is designed to perpetrate upon the people of this country has already been carried out in England, and as a result people there have lost confidence in electric lighting. Just as soon as a man gets working on the secondary (storage) battery it brings out his latent capacity for lying. The receiving of money for such articles as those ought to be made an offense at law, for, if it is not a form of obtaining money by false pretenses, I don't know what is.' All this is pretty strong language and not easily got around, and as Mr. Edison is wealthy we are somewhat surprised that he has not been sued for likel if his statements were false. But Mr. Edison is not alone in this matter. Sir William Thomp son when he first saw storage batteries was astonished, and received from the French company a heavy retainer as its electrician, that on investigation he became continced that there was nothing in it, and returned the retainer to the French company.

Evidently the writer of the above has read Mr. Edison's interview on storage batteries in the Sixteenth Hulletin.

BUENOB AYRES. TESTIMONIAL. Sometime ago we installed a plant of one Z dynamo and 60 A lamps in the iron foundry of Messrs. Schwartz & Brother, Buenos Ayres. We have recently received the following testimonial relating to this plant:

"BUENOS AIRIN, 15 August, 1883.

THE EDNOS FLECTER LIGHT CO., New York.

GENTLEMEN: —Having now had the Edison electric light plant you sold us in dady operation in our from foundry for 3 months, we take sincere pleasure in stating that it fully answer all our expectations and 6 giving entire satisfaction in every respect.

Very truly yours,

PETER SCHWARZ & BRO." .

BANQUE DE FRANCE, PARIS. PLANT INGREASED. The installation of 60 lamps in the Banque de France, Paris, mentioned in the t5th Bulletin, has been increased to 250 lights, which will light the entire printing department of the bank.

BLIOU THEATRE, BOSTON. An amusing adaptation of the Edison light has been made a this theatre in the state of "Virginia." The two red horson to the devil contain t-6-cantle lamps, which, being connected to the Edison system in the theatre, are lighted when the devil disappears upward, producing a striking effect. The entire theatre is also lighted by Edison lamps.

LAROE SUGAR REFINERY PLANT. WILLIAMS BURDIS, N. Y. The statulation in the new sugar refinery of Mess. Ilaveneyre & Eller, mentioned in the 16th Bulletin, has for sometime been completed. The refinery, filter house and boiler house are built-interfly of brick and iron and are absolutely fire proof. The warehouse is a brick structure with wooden beams and floors. The plant consists of 3 K, one L and one Z dynamo, the driving power for which is obtained from the main engines, transmitted through suitable counter shalling and beiting. There are 956 lamps in circuit, distributed as follows:

Fur	ER 11	ousk:	-											LARPS.	
	Baser	ment				-	-		•		٠		•	21	
	ıst fi	loor						-		•				56	
	2d						-		-		•		-	12	
	3d						-	-		-				48	
	4th						-				•			25	
	5th						-		•		•			35	
	gth						-			-		٠		43	
	7th								-		•		•	31	
	8th	**		٠			-							51	
	9th	**			•	-	-		-		•		٠	24	
															34
Rrs	INERY	:													
	Base	ment		-		•	٠	-		-		•		44	
	tst i	loor	-		•				٠		•		•	20,	
	2d			-		-	-	•		-		٠		32	
	3d	**			•				٠		•		٠	26	
	4th	**		٠			-	-		-				25	
														16	
	5th	**			•				•		•			10	
	5th 6th	.,	-		•	. '			•		•			30	
						٠.				-					

| Stin | Lamps | 9 | 9th | ... | 25 | 10th | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 | ... | 10 |

Total number of lamps

The installation of these lamps required the placing of 25,000 feet of moulding, 425 feet of electric tabe, and 3,203 lbs. of copper wire. Seventy-five lights were started May 29th, and the remainder

The dynamos are controlled by one automatic regulator, which regulates the electrical pressure throughout the entire system.

have been added daily as the work progressed.

NEW ORLEANS. PLANT FOR REFRIGERATING WARE-HOUSE. We have installed a plant of one dynamo and 50 A lamps in the cold storage warehouse of the New Orleans Refrigerator Company at New Orleans.

LONDON. THE "MALABAR" LIGHTED. We take the following extract from the Morning Post, London, August 9th, relating to the lighting of this vessel:

"This crening II. M. S. Malabar, the Indian troopship, was successfully lighted throughout with Editor's incandescent light, with which all the Indian troopers are to be fitted. The ship, from stem to stem, from stoke-hole to yard-troopers.

PHILADELPHIA. STREL WORKS LIGHTED. We have installed a plant of one T dynamo and 100 A lamps in the Midvale Steel Works. Philadelphia.

ENGLISH STEAMSHIP PLANT. The English Edison Company has received an order from the Peninsular & Oriental Steam Navigation Company to light the steamship "Valetta," at present building on the Clyde, with two L dynamos and about 250 A lamps.

THE LOUISVILLE EXPOSITION PLANT. This is the finst Exposition building ever lighted throughout by incandescent lamps. To light such a vast structure, whether by gas or describely, presents the most difficult problem in artificial illumination. Not only must the vast area he brilliantly and uniformly lighted, but each of the exhibits, including canopied and inclosed places, must have equal and complete illumination. Besides these, there are the Art Galtery, the entrances to the building, and the special exhibits, each pre-enting to some posultar difficulties. The Eddon Company for Lodated Lighting undertook to solve this problem, as presented at the Louiville Exposition building, and to do it by means of the Eddons system, believing that they could light the armeture more buildingly, uniformly and letter in every way than it could be lighted by gas, by describer are light, or by any other system of affidical.

light. The result confirms their helief. By universal consent, the Louisville Exposition, lit by the Edison incandescent lamps, is the hest lighted structure of its size ever illuminated by artificial light.

The Southern Exposition intilding is one of the largest structures of its kind ever built, the area of the main building being 677,400 square feet, with an average interfor height of an feet. To illumine kin vast space the Edition Consupara pixe installed 3,096 statem-candle Edition himps, equal to 6,0,08 candles, an average of 175 square feet per large. The estimate given by gas officials for lighting only shows the Edition estimate compare feavorally in regard to 6 flags only shows the Edition estimate compare feavorally in regard to fugures, loat, in the opinion of the public, the building is lighted for more stratectorily that could be done by the same number of gas jets. Estimates were made by various gas experts to light the building while gas, but they called for from 2,000 to 12,000 gas first to accomplish the results attained by the Edison Company with less than 4,000 homes.

This immense plant was described in the typh fullerin, but, if may be well to regulatishe the principal figure. The contract calls for the installation of 4,600. Edition lights of fix candle-power each, to supply these lamps fifteen dynamon-unclines have been installed, together with the requisite engines to drive the same. The copper wire med for the conductors intemplorate the building weights over 40,000 pounds, and would measure as miles in length; if stretched out in a stripk line. This phase is the largest cere frastled to light a single building, and is equivalent to a gas plant manufacturity to consider some or the same of the conductors.

Grave doulits were expressed that so large a plant could be installed in such a short time as was given to the Edition Company. Expert gas men had stated that it would be impossible to light the building with gas within the time limited. The Edison plant,

according to agreement. The contract for this plant was signed by the Edison Company, July 3d; work was commenced July 9th, and on August 1st all the conductors had been put in place and the current was passing, supplying light to the night circuit. Even as early as July 24th, the largest part of the plant liad been installed. The total capacity of the plant is 6,000 lamps of 16 candle-power

each, but there are in use only about 4,800, including those outside the building, distributed as follows:

MAIN BUILDING.

Section A, West side		lamps.
" " North side	85	••
" " East side	96	••
" " South side,	106	**
Section B. West side		
" " North side	100	
" " Fast side	158	
" " South side	114	
Section C. West side	252	
North side	132	**
" " Fast side	258	
" " South side	112	
Section D. West Side	140	
" " North side	77	**
" East side	152	
" " South side		**
Main Tiallery, West side	88	**
" " North skle	(2	
" " East side		**
" " South side	58	
Centre Electolier	50	**
Organ Gallery	110	**
Under Organ Gallery	112	**
Concert Hall.		**
Hand Room	4	**
Galleries south of centre		**
Under Gallery south of centre	102	
5-light Electrollers south of centre		**
12.light Electroliers centre		**

Electric Light Engin																		18	lamp
Hydraulic Annex																 		18	**
Corner Towers																		44	**
North Tower																		94	- 14
Sixth street Tower											 						 	136	**
Fourth street Tower	 						٠,											149	**

•	UTSIDI	Or	м	AI3	BUI	LDING.		
Art Gallery							340	lamps.
toiler Annex							36	**
Tre Annex							4	**
intrance North Tower							15	**
intrance Sixth street T	ower						30	
intrance Fourth street							30	**
iate Houses							42	**
MI Night Circuit							250	
								-
Grand total							1.745	lamps.

The plant has worked well from the first, and has given the most unqualified satisfaction to all concerned. The opinions of the public may be gathered from the following extracts of a few of the newspaper comments made during the progress of the Exposition:

Louisville Commercial, Aug. 12th:

"In the evening, as was announced would be done in yesterday's Commercial, the Art Gallery was lighted up. Was it beautiful? Go ask the 20,000 people who inspected it, and with one accord they will answer 'Yes' with a big Y. The soft radiance of the Edison light shone not only over fair women and brave men, it illuminated the pictures and statuary and gave to them a beauty scarcely their own, beautiful as they are."

Parl, August 17th:

"The eyes of the entire scientific world have been directed to the Edison electric display at the Exposition, waterbing with great interest the installation of the largest plant the world has ever seen. The trial has been anade, and thus far success has marked the result. It is by far the result installation of the trial trial trial trial trials are success has marked the result.

Louinille Courser-Journal, Aug. 23:

"A years that of vironing embasium, childhe strukturas you may call up on justes, becausely protected when speculated one the building and grounds of the Southern Expossiple at hight. For even building and grounds of the Southern Expossiple at higher. For even building is an experiment of the southern Expossiple at higher and the park when the view that this could not the Expossible charge of the department of the country of the Expossible charge from the department of the charge of the country of the charge of the

N. F. Times, Sept. 3d:

"The illuminated building seen from the distance presents a most leasufful appearance. The building is tighted by Edison haups. It is altogether probable that the electric lights and the night exhibition have alone saved the enterprise from a heavy loss."

Cincinnati Commercial, Sept. 3d:

"These feteric lights are the one great feature of the Esponition, and they are centrally the gravest and most overelled thing about it. Buttle the day it is a time place, but at shift, one handly recognize its, as pelvoised that the state of the state

Cincinnati Enquirer, Sopt. 4th:

"In arranging the Art Gallery the present committee seems to have considered the all important subject of light, so that even in the day time not one of the many pictures is so located as to render seeing it an impossibility. Then at night title Edison incandescent light is broughl into play. Nearly

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fee builded of these diriculate langs are sauged in regular roots above the come, where the gas likes formerly used to run. Behind them has been placed a continuous reflector, which thouse the light all directly upon the paintings and leaves the centre of the room in subalest shadow that it credital to the eye. The rays are warm and the effect upon the paintings pleasing in the extreme."

N. F. Herald, Sept. 7th:

In the main buildings and Art Gallery the Elison incandescent light is used, 4,600 lamps in all. The effect is wonderful, and in the Art Gallery it is particularly good.

The Studio, New York, September 15th:

"In the Art Budding, all of the departments are conclosely lighted, received by adult, the Hillson found-test cells light length or collected of gas. I with the painters and owners of the picture for each with the painters and owners of the picture. For each with the gas of the picture is the picture of t

The installation of this large and successful plant was made under the supervision of Mr. M. F. Noore, General Manager of the Edison Company for Isolated Lighting, while the wiring, arrangement of faxtures and the distribution of the light, were under the charge of Mr. I. Stieringer, of the Edison Company.

ENOLAND. TWENTY-ONE STEAMSHIP PLANTS. We have received from the London Kildmon Company a list of the steamships on which the Edison light has been installed, or is in progress of installation. These steamships number 21, and the list is as follows:

1000

(419)

NAME OF VESSEL	ROUTE.	OWNERS.	LAND.
NAME OF VESSION	(A) C I I I	Commence of the Commence of th	
II. M. S. Malabar	Indian Troopship	1	100
" Crocodile"		1 13	400
" Serapis*		The tiovernment	400
" lumna"			400
" Emplicates"		. 1	400
S. S. Oregon	Atlantic Service	"Gulon" Line	500
" Tarawera	Australia and	I Union S. S. Co. of New	150
" Waihora " Takapuna	New Zealand	Zealand	150
" Clan Mac Arthur	Liverpool and	Glan" Line	150 150
" Clan Mac Intosh			
" Mmerva	On the La	Compagnie La Platense.	180
" Apollo	(Plata	1	180
" Adelaide"	Adelaide and	Adelasde S. S. Co	150
" Valetta*	Southampton	Peninsular & Oriental Coy	250
" Pateena*	Tasmania and	Tasmanian Steam Nav.Coy	150

On the La National Brazilian S. S.

Rio Pardo......

Win Parana

CINOINNATÍ. PLANT FOR OOLOR PRINTERS. We have received from Messrs. Russell, Morgan & Co., printers in colors at Cincinnati, an order for a plant, consisting of one dynamo and 300 A Jamps, to be installed in their printing establishment.

NEW YORK OITY. BLOCK OF HOUSES TO BE WIRED. We have received from the Clarke Estate an order to wire a block of 28 houses in 73d Street, between 8th and 9th Avenues, New York City, for 1,204 Edison lamps. It is proposed to light these houses, when completed, from an Edison plant to be placed in the neighbor-

PERRY BOAT "FANWOOD" PLANT. NEW YORK OITY.
This plant, which was mentioned in the 10th Bulletin, has been

This plant, which was mentioned in the 19th Bulletin, has been running for the last six weeks. The plant consists of a Z dynamo and 59 sixteen-candle lamps distributed as follows:

Ladies' calsin, 5 electroliers, 4 lights each	٠.	20	lamps.
Gentlemens' cabin, 5 electroliers, 4 lights	each	20	
Engine Room		4	
Main Deck		4	
Pilot House · · · ·		,	
Hold, Fire Room, &c		9	
Thomas		1.	

The power is supplied by an 8!4 x to Lawrence Engine, with a 7×8 Knowles condenser. This plant will run the total number of lamps at full candle-power on 10 pounds steam pressure in the hoster.

SANTIAGO. LARGE RESIDENCE LIGHTED. The following description of the isolated plant in the private residence of Malame Cousino, Santiago, Chili, mentioned in the Seventeenth Bulletin, has been furnished as by Mr. W. N. Siewart, under whose supervision the installation was made:

"The nucleiery for this plant is contained in a Swin childred but in common of the geometry, expectably for this proper. It consists of a bother bath by Roth. Westerful & Co., Clester, Pa., we Arminghan & Nies expeire, Son Caylaman, with few search search period, required to the covered in a Caylaman, with one where bears, principle, required, the covered in Caylaman, with one where the covered in the Caylaman of the Caylaman

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^{*}The year's marked thus have not yet been completed.

The garden is lighted by lamps and reflectors placed on statuary, as wellas by lamps introduced in the ornamental rockwork and fountains; while the four gate pears have each a five-light globe. In the house, the fixtures are all of fire-gilt, and of the most expensive class, mostly made to order by Bergmann & Co., from photographs of the rooms. The grand vestibule has a 24-light floral electrolier with six 3-light heackets to match, while the salons, music, card, billiard, dining and rea rooms have each appropriate futures in harmony with the decorations. The plant has been running nightly for the past three months in the entire satisfaction of Madame Cousmo,

Formerly there were only 60 gas hurners in the house and grounds, and these were mostly in the kitchen and servants' quarters. Madame Cousino would not have gas in the other parts of the house, on account of its had effect on the decorations. These 60 gas jets formerly cost \$200 monthly. If gas were used in the house equivalent to the amount of Falson light, the gas bills would be not less than \$800 per month, without counting interest on fixtures, while the cost of the Edison light including also interest and depreciation is about \$125 per month. The residence in which this plant is installed is valued at \$600,000, and its contents are equally valuable."

PARIS. HOTEL DE VILLE. A PLANT INCREASED. A Edison plant of 60 lamps and a Z dynamo was installed in the chambers of the Conseil Municipal at Paris, just after the Electrical Exposition in that city in (SS). This plant has been in continual use ever since that time, and has given such satisfaction that an order has been given for a plant of 600 lamps to be installed in the new Hôtel de Ville in the chambers to be occupied by the Couseil Manicipal, as well as in some other parts of the building.

BRUNN, AUSTRIA. A FACTORY LIGHTED. A plant of 250 Edison A lamps is being installed in a factory at Brinn.

TESTIMONIAL FROM THE STAR & CRESCENT MILLING COMPANY. The following testimonial was received last spring , from the Star & Crescent Milling Company, Chicago:

"Citte was, May 24th, 1883.

23 WESTPEN EDISON LIGHT CO.,

CHICAGO. GENTLEMEN: -- In reply to your favor of the 19th, would say that this company have been using the 'Estison' for lighting their mills for the past three months, that the light gives good satisfaction in every particular, is no trouble to operate, and is better and cheaper than gas. We take pleasure in recommending it to all parties interested.

Yours truly,

STAR & CRESCENT MILLING CO."

TESTIMONIAL FROM THE NOVELTY IRON WORKS. The following testimonial was received last spring from the Novelty Iron Works, Dubuque, Iowa:

"Dearger, lows, May 26th, 1883.

WEYGER EDBOS LIGHT CO., Current Itt

GENTLEMEN: -We do not use your light during the Sommer months, but were well satisfied with its working whilst in operation during the Winter months. For machine work we consider it much superior to the arc light, from its perfect steadiness, and capability of being controlled by each workman to suit his particular purpose. Voors truly,

NOVELTY BOOK WORKS,"

TESTIMONIAL FROM OHIOAGO. The following testimonial was received last spring from Messrs. Norton Bros. & Co., Chicago,

"Curacio, May 23rd, 1883.

WESTERN EDISON LIGHT Co.

DEAR SIRS:--We have been running the Falison light about 6 months, during which time we have had no trouble or interruptions of any nature and we are perfectly satisfied with the plant. The light is safe and reliable and we consider it much superior and cheaper than gas. A four such belt is suffi cient to run a 60-light dynamo.

NORTON BROS. & Co."

NEW YORK CITY. PLANT AT NIBLO'S GARDEN. The Edison installation at Niblo's Garden, as used in Mesar. Kirally Ilhothers' spectacular pantomine, "Excebior," consists of one K dynamo, 55 vots electro-motive force, capable of supplying current for 500 eight casalle-power B lamps.

At each performance of "Excelsion," the Edition lights are in use as follows: in act, hast seens, the electric torch held by the sharacter "Light;" at act, hast seens, the Brooklyn Bridge; 3d act, its seens, the discovery of the electric spath in Yoda's laboratory. In the last seens the halled thances are provided with wants, each having an Edison lump on the end, and festoom of lampa are lowered from the flys above. At a given signal the entire number of lampa, 400, are lighted insutrationously, producing a magical effect of great behavior of the state of the state of lampa and their proper candle-power is a very severe test on the regulating caucius of the engine, and the dynamo.

SUPPLIMENTARY TESTS OF THE INOANDESCRY.

LAMPS SHOWN AT THE PAIR EXTILIATION. The Report
of the sub-commission of the jury of the Paris Estilution, specially
been noticed in the Bulletin. More recently, MM. Alland,
F. Le Blanc, Joubert, Pooler, and II. Tresca, the French members
of the experiment-commission of the jury, have published in the
Comptas Renduc of the Academy the results of their tests unde
upon dynamo-machines, and upon are and incandecent lights.
After giving the numerical results of the tests unde upon incandescent lamps, the authors asy:

"We have already mentioned that other and more systematic experiments, the chiel object of which was in measure the electrical data exactly, had been made on the four systems of lamps which we have just passed in review. "In these experiments, the horizontal intensity only, was measured; and this at an angle of 45°. This intensity morrower, was referred to the spermacell candle as the unit, burning 7.8 grams per hour. Nine and a half such candles are the equivalent of one careel.

"In the following table, we give in conjunction with the numbers which we have obtained, those of the sub-commission above mentioned; all being referred to the mean spherical intensity, and to the carcel lamp, taken as

COMPARISON BETWEEN THE TWO SERIES OF EXPERIMENTS.

The second secon MILIN CLASS . BRISIS LINES. LUST-101 LINES. THE CHAPT 137 000 Ohma 41.00 20.00 50.00 43.0 41 m 14.00 1 55 1-47 1.35 9.79 065 1 77 1.12 7.60 7 10 267 Kilogrammeters | 13.18 7.94 6.51 5 91 1 45 212 1 15 2.13 15 29 19-24 12 61 21 55 11-91 11-31

*The numbers in this column are from experiments made by the Special Commission on lamps, the intensity of which at 45° was carried up to 32 candles.

"Although these two series of experiments were made with an object of the desired different, and by methods widely varying, it will be remarked how closely the numbers which were olazioni, approach each other. Indeed, they agree so well that each of the four systems of lamps is sharply characterized by the electrical data which at affords.

"This agreement is even more evident when we consider that the economy becomes uses and more considerable as the landous latensity is increased. This is well allows in the three columns which give the results of the measurements with the Swan lamp. When the latensity is doubled the economy increases from 13 to 19 carcels per horse-power of current expended in the lamp.

"In a general way and for a mean spherical intensity of 1.a carcets—a fair practical value—we may count on an effective illumination of from 1a to 13 carcels only per horse-power of current; nr aloust to carcets per horse-power of mechanical work, by meant of incandescent lamps.

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"Electric candles familis 40 carcels per horse-power of current; regulators nearly 100 carcels; so that, in general, we may say that the exnounts value of the three systems is nearly as the numbers 1, 3 and 7; always remembering that in each system the most intense lights are always the most economical."

ity "mean spherical intensity" is meant the mean value of the light calisted in all directions from the blament. For the Maxins lamp the "mean spherical" is 74 per cent, of the horizontal face intensity, and 78 per cent, of the horizontal intensity at 45°. For the Falson lamp, the "mean spherical" is 98 per cent, of the horizontal face intensity, and 74 per cent. of the horizontal intensity at 45°. For the Lane-Fox and the Swan lamps, having round fibres, the "mean spherical" is 58 per cent. of the horizontal face intensity and 69 per cent, of the horizontal intensity at 45°. The Maxim lamps were tested in three groups, the first of 100, the second of 50 and the third of 25. For the first group the mean spherical intensity was 1.44 carcels (13.68 candles), for the second 2.80 carcels (26.6 candles), and for the third 3.77 carcels (35.81 cassiles). The Edison lamps tested were 528 in number, all run on one circuit from the large dynamo in the Exhibition. The numbers given represent the mean value of all these lamps, i. c., 1.57 carcels (14-9) candles) for the mean spherical intensity. But six Lane-Fox lamps and four Swan lamps were submitted to test, the current being supplied from an Edison Co-light dynamo. The mean spherical intensity for the Lane-For was 1.64 carcels (15.58 candles), and for the Swan 2.19 carcels (20.8 candles.) Comparing together the energy required by these lamps to maintain the above light-intensity, it appears that while the Edison lamp gives a mean spherical intensity of 172.14 candles per horse-power of current expended in the lamp, when huming at 14.91 candles, the Maxim gives only 150.95 candles per horse-power when burning at 26.6 candles; its economy being much less even at the higher temperature. The Lane-Fox lamp gives 130.53 candles per horse-power when hurning at 15-58 candles, and the Swan 204,72 only, when burning at 20.8 candles. So far as lamp-efficiency is concerned, these results are quite as favorable to the Edison lamp, to say the least, as those of the Special Sub-Commission.

On the questions of matches efficiency the figures show that the large Edward comments of all shapes—but has in the fillad and therefore not at its naximum economy—consumed (8.3 to filladised horse power. The Weston machine (the field field yad Antima machine) communed 23 indicated horse power for 100 lamps, 17.12 for 50 and 9.15 for 51. In the first teasy for cent. of this power appeared in the lamps; in the second 3 year cent, and in the third of per cent. While he take 200 lamps is the second 3 year cent, and in the third of per cent. While he take 200 lamps; in the second 3 year cent. of the energy given by the helicates, appeared as work in the lamps.

BATESVILLE, VA. TESTIMONIAL. We print the following extracts from a letter received by us regarding one of our plants:

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"MITTER MANUAL LABOR SCHOOL, | BATINVILLE, VA., Sept. 6th, 1883.

THE REBOON COMPANY TOR INCLATED LOTHING.
GENTLEMEN: —We are glad to report that the light is working finely. As far as I can see, it comes fully up to what was chimned for it. * *. I desure again to express my entire satisfaction with the plant, and with the fair and literal way in which it has been installed.

Very respectfully, C. E. VAWTER."

TROY. NEWSPAPER OFFICES LIGHTED. We have just completed the installation of a Z dynamo and 6o A lamps in the offices and composing rooms of the Northern Budget and Troy Togram, beloneing to Messes, C. J. McArthur & Son, Troy, N. Y.

BOSTON. ANOTHER PLANT. We are installing a small dynamo and 25 A lamps in the saloon of Thomson H. Murch.

YPSILANTI, MICH. PAPER MILL LIGHTED. We have installed a plant, consisting of a Z dynamo and 60 A lamps, in the Mill of the Ypsilanti Paper Co. at Ypsilanti, Mich.

DANVILLE, VA. COTTON MILL PLANT. We have just completed the installation of an L dynamo 28d 150 A lamps at Danville, Va., in the cotton mill of the Marotock Manufacturing Company.

LONDON. PLANT INGREASED. We take the following extracts from the London Electrician, September, 181:

"The Edison Company have for several months lighted a considerable most first of the Hollour Restaurant with Son lamps, and arrangements are now in progress for laying down plant for upward of typos additional for-smalle lamps." " ". When lighted throughout, the Hollour Restaurant installation will be the largest of the kind litherto under."

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HOLYOKE. A THIRD ORDER FROM THE MERRICK THREAD CO. We are installing a plant of one dynamo and 300 A lamps in a new mill being erected by the Merrick Thread Co., at South Holyoke, Mass. This being the third mill lighted by us for the Merrick Thread Company, the order affords very gratifying evidence of the merits of the Edison system. We first installed a plant of 95 B lamps in No. 3 mill, in March 1882. The life of our lamps had averaged 1,635 hours when night work was discontimed, and the plant gave satisfaction in every way. One of the officers of the Merrick Thread Company stated that they formerly paid \$2.12% per 1000 feet for gas, but that since the introduction of the Edison light, they had saved enough to pay for the plant and all cost of maintenance, including power, interest and depreciation, besides a good margin.

In September, 1882, the Merrick Thread Company completed a new mill, and gave as an order to light it. We wired the mill for 950 B lamps, and installed dynamos for 600. The others will be put in operation as fast as the mill is equipped with machinery.

The third order from the Merrick Thread Company, above mentioned, is for another new mill now being built at South Holyoke. This building is being wired for 500 lamps, of which 300 will be used as soon as we finish the installation,

SYRACUSE, N. Y. STEEL WORKS PLANT. We have recently installed in the works of the Sanderson Brothers Steel Company, at Syracuse, a plant consisting of a T dynamo and too A lamps.

PALMER HOUSE PLANT, CHICAGO, EXPLANATION. The following correspondence explains why the Maxim lamp, infringing the Edison patents, is to be used at the Palmer House:

"WENTERN EDGEN LIGHT COMPANY, I

Carcano, October 6th, 1883.

Tuz Edmon Electric Light Company, 65 Fifth Ave., New York City.

GENTLEMEN :-- We have to report a rather curious experience at the Palmer House in this city, where you are aware a sixty light Edison plant has been running for the last eighteen months—the installation having been made before this company was formed.

Without informing us, or giving us a chance to compete, the Palmer House accepted a proposition from the United States Electric Light Company to remove our plant, and install in its place a Maxim plant of more than three times he capacity.

We have good reason for believing that this exchange was made at a triffing expense to the Palmer House, and that the United States Company expects to get its compensation out of the advertising which will be given to the Maxim light, and in being able to contradict the statement which we have always made that "no Falson plant once installed, either in this country or in

Europe, bad ever been removed." The United States people here have been much mortified at the ejection of their plant from the First National Bank, where it had been given a fair trial,

and the substitution of an Edison plant in its stead. Also at the list recently sent out from your office showing where 26 of their plants had been rejected, and many of them superseded by Edison plants.

We have perhaps no right to complain of the action taken by the Palmer House managers, as the plant was their own property and they were entitled tu make any disposition of it which might seem to be to their advantage, but we felt that we at least had the right to know the reasons assigned for the change,

and therefore made inquiry of the Managing Partner. His answer you will first herewith inclosed. We regret that we were not earlier informed of this plan to take out our light, but the contract was closed before any one of us knew that a change

for a larger plant was even in contemplation. We trust, however, when their new plant gets into operation and they are given an opportunity to compare the light with that which our plant had been supplying them, and which they themselves admit to have been entirely satis.

factory; also to compare the cost and trouble of operating the Maxim plant with that of the Ellicon, they will regret having made what seemed to them so good a largain without a little further investigation.

Very truly yours,

WESTERN EDISON LIGHT CO., per John M. Clark

Vice President."

Mr. Howe's letter, mentioned above, is as follows:

"PALMER HOUSE, CHICAGO, H.L., October 6th, 1883.

WESTERN EDISON LIGHT COMPANY,
Chicago, III.

GENTLEMS:—In reply to your impuly as to the reason of the removal of your lightfrom the Painer House, I will asy that this was determined open, and lecause of any trouble with your machine or apparate, but for the reason that we were also an eportualty to exchange your dynamo, of 60 lights capacity, for a Maxim machine of 200 lights reapility, very advantageously to us.

As to the Elison plant exchanged by us, we are pleased to state that neither machine nor lamps had ever given us any trouble, and that the light was absolutely steady and satisfactory, and fully up to your representations in every respect

Yours truly,

WILLIS Howg,

Managing Partner."

VIENNA. THE EDISON LIGHT AT THE EXPOSITION.
We take the following extract from the Sanilary Engineer, New York,
October 4th, regarding the Edison light at the Vienna Electrical Ex-

"The "Compagnic Continentials Editor" and the "Sockée Electrique Editors, of Erick single breaff known Folkon little, impre and dynamon, Him. minused a holl, garlor, two belormons, allison little, impre and dynamon, Him. minused a holl, garlor, two belormons, allison little grant g

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by Blummond with 2 lights on a rich tense and place chandler; the analysis of the distribution of the stitting from the distribution light at very plasming effect. The belroom, sho in I loan XIV. 1956, distribution is not local to the chandler of the chandler below the proposed of the chandler below the proposed of the chandler below the chandler of the chandler below the proposed of the chandler while the chandler of the chandler and the chandler of the chandler and the chandler of the chandler of the chandler of the chandler and the chandler of the chandler of the change of the chandler of the cha

WARE, MABS. WOOLEN MILL LIGHTED. We have received an order for a plant consisting of one dynamo and 200 A language, to be installed in the woolen mill of the G. II. Gilbert Manufacturing Co., at Ware, Mass.

PAWTUOKET, R. I. PLANT FOR MACHINE SHOPS. We have installed in the machine shops of the Jenks Manufacturing Co., at Pawtucket, R. I., a plant of one T dynamo and 100 A lamps.

BUFFALO. MACHINE SHOPS LIGHTED. We have installed a plant of a Z dynamo and 60 A lamps in the machine shops of the John T. Noye Manufacturing Co. at Buffalo, N. Y.

DETROIT, MICH. PLANT FOR ENGINE SHOPS. We have received an order for, and are now installing, a plant of one dynamo and 50 A laurps in the engine building shops of the Fulton Iron Works at Detroit.

PHILADELPHIA, PRAISE FOR THE "RECORD" FLANT.
The Philadelphia Record, October 6th, speaking of the Edison isolated plant that lights the building says that "The Edison

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incandescent light has proved a success in the Rward office. Some of the lamps have been in use for more than three thousand hours without apparent injury to the carbon,"

THE EDISON LIGHT ON STEAMSHIPS. We take the following extract from the September number of the New York Elatrikan:

"the Egilbana, Exerding cross this country, says that is journeying our basin to bear. Now, he travited from all their to New York, on the ourself Polynis, which is illuminated by the Edison lights. After an enthocate discreption of the startar, Je said." The air good, and this clott, click enthograph of the startar, Je said. "The air good, and this clott, of the start of the said polynish of the start of the said polynish of the start of the said polynish of the said polynish of the start of the said polynish of the said polyni

LONDON. HOUSE OF COMMONS PLANT INCREASED.
We take the following extract from the London Electrician, September 22d:

"Mr. Sake I derer has purkased the Edinon plant which has been used a the House of Limonson during the past Section. It intentals, now may be used as the House of Limonson during the past Section. It is intental continued to the Continued and the

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3.3

ALLANY, EDISON LIGHT AT THE BURGESSES ORLE.

RACTION. One of the features at the eclebration of the fifthen
anniversary of the languese' Copp. Allany, October 5th, was the
ladl to the Armony of the Cops. which was lighted for the occasion
by Eliforn langs. The current fine be langs was detailed from
the plant of Meses. Weed, Paysons & Cos., by means of conductors
temporarily part up for the purpose.

We take the following extracts from the Albany newspapers regarding this lighting:

Daile Press and Knickerbocker, October 9th:

"From the ceiling was festooned red, white and blue streamers, forming double canopy. In the centre was a magnificent languet electroller of the Edison Electric Light Company, similar to that recently exhibited in the capitel. Leaded down with bouquets, the lines of the variegated globes, illuminated by incandescent lumps, presented a some that is indescribable * * '. The some presented in the Amount half last evening was magnificent is pond description. The cold words describing the decorations, in another column, give no adequate idea of the grandear of the surroundings, illuminated by Edison's electric light. The brilliancy of the flower reflectors in the electroliers, with their variegated colum and the soft effugence of the electric lamps, suffused the half with a light as grotal as that of as unclouded midday sun. The plants and flowers assumed deepened tues and many of them being tropical, they looked as if springing from their native sed. The decorations, too, were rendered more beautiful by the aid of this light. The guests appeared entranced with these elegant surroundings. The most extravagant poetic Imagination never conceived a more delightful scene in fairy-land than was here presented. All were rapt with admiration - the Indies especially. Never before, In this city, was there such a combination of magnificence and points of interest."

Allany Evening Journal, October 9th:

"The brilliant company which had been hidden to the ball stanced in a scene not far removed from the realm of the fays. Illumination was formished by the dazelling jets which Tellous has put in larners for critication. The choicest flowers of the hothouse made up a show which deft hands had prepared by mural decoration. The amony never holed so beautiful."

Albany Evening Post, October 13th:

The laundrest of people who visited the amony of the languages. Compared and animirat the heusilat characters and furnary meritally $p_{\rm eff}$ in Markov and a fainteen the heusilate through the and furnary meritally $p_{\rm eff}$ in Markov Co., for the Irillians illumination of the Corps futures, little $p_{\rm eff}$ in the latter and the state of four loans. To Mr. J. H. Vall, superintendent of the Edition Industry Co., and Mr. I. Stategier, the well-known expert in both gas and detection lighting, ahead the credit is ejectre. The employment of new of this standing head the credit is ejectre. The employment of seen of this standing the contribution of the good poligonation articleshilly of the Editions Co., "Contribution of the State Contribution of the State Con

Sunday Press, October 14th;

"These superb light-giving decorations, (the Edison electrolers), added was used to the learny and latiflatory of the evening celebration of the Burgerses at their amoury. It is hoped that the corps will retain them, as they certainly are an attractive feature to their spacious armory."

UTIOA, N. Y. SHOE FACTORY TO BE LIGHTED. We have received an order for a plant of one dynamic and 200 A lights, to be installed at Utica, in the slice factory of Mesers 11. J. Holbrook & Co.

BALTIMORE. PLANT FOR PORK PAOKING ESTABLISH-MENT. We are installing a plant of one dynamo and 50 A lamps in the establishment of Jacob C. Shafer, pork packer, Baltimore, Md.

OINOINNATI. PLANT FOR OARRIAGE BUILDERS. We have sold a plant of one dynamo and 25 Å lights to Messrs, Sechler & Co., carriage builders. Cincinnati.

DANVILLE, VA. COTTON MILL TO BE LIGHTED. A plant of one L dynamo and 150 A lamps is now being installed at Danville, Va., for the Riverside Cotton Mills.

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CORNWAIL, CANADA. FLANT DOUBLED. We mentioned in the 17th Bulletin the plant at the Cornwall Mills, belonging to the Canadian Cotton Cv. This plant, constitung of 30 almap, has given such satisfaction during the time it has been in operation, that the Canadian Cotton Cv. has given as an order for two additional K dynamos and 500 A lamps, thus making their total capacity 1,000 lamps.

OARDINGTON, PA. FACTORY PLANT. Messrs. Taylor, Wolfenden & Co., have ordered from us a plant of one dynamo and 50 A lamps, to be installed at Cardington, Pa., in the cotton and wooden mill of that firm.

CARDINGTON, PA. ANOTHER FACTORY PLANT.
We are installing a plant of one dynamo and 50 A lamps in the
cetton and wooden mill of Mrsers Wolfenden, Shore & Co., at
Cardington, Da.

FRANKLIN, PA., OIL REFINERY TO BE LIGHTED. We are installing a plant, consisting of a small dynamo and 25 A lights, in the works of the Eclipse Lubricating Oil Co., at Franklin, Pa.

BROOKLYN, N. Y. SUGAR REFINERY PLANT IN-OREASED. The Brooklyn Sugar Refuery, which has been using a plant of one Z dynamo and So lamps, has given as an order increasing the plant to two dynamos and 400 A lamps.

MALDEN, MASS. FACTORY PLANT. We have installed in the cotton waste factory of Mr. G. K. Goulding at Malden, Mass., a plant of one dynamo and 25 A lights.

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CINCINNATI. PLANT FOR FLOURING MILL. We are now placing a plant, consisting of one dynamo and 50 A lamps, in the flouring mill of Messrs Lape & Brother, Cincinnati, Ohio.

SYRAOUSE. DRY GOODS STORE TO BE LIGHTED. An order has been given as for a plant of one L dynamo and 150 A lamps, to be installed at Syracuse, N. Y., in the dry goods store of Mesers. D. McCariby & Son.

ANOTHER STEAMSHIP PLANT. An order has been received from the Oregon Railway and Navigation Co., for a plant of one L dynamo and 300 B lamps, to be installed on the steamship "Olympia," now being built at the shiparats of Mr., John Roach.

PITTSBURG, PA. THE "TIMES" PLANT. We take the following extracts from the Pittsburg Times, October tech, relating to our plant installed in the offices and composing rooms of that

"The offices of The Times, together with the composing and press rooms, have undergone a transformation within the past ten days as regards methods of illumination. The Times establishment has been fitted throughout with the latest invention of Edison in the shape of his incamlescent lamp. * * * A every case in the composing room of the Times there has been placed an m incandescent lamp which sheds a brilliant, but withal soft light of sisteen-candle power. The printers are delighted with the light and say that it makes an inestimable difference from the flicker of a gas jet. * * * At each of the editorial and reportorial desks there is also placed a lamp, and all of the attaches of both departments unite in commending it as the best light ever invented by which to turn out copy. The proof readers also express their great satisfaction with the new illuminant. There are eighty-five lamps in use in the office of The Tiers, and the electrical energy, by means of which they are run, is supplied by a dynams-machine, in charge of the engineer who runs the Times engine. The wires are carried from the dynamo-machine to the lamps in different parts of the building through ordinary gas pipe, and as far as the appearance of the lamps are concerned one would think they were some new fashion of gas burner until the current isturned on and the lamps lighted, when the marked difference would at once he noted. The lamps are provided with neat shades and are tasteful in appearance."

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SANTIAGO. PROGRESS OF CENTRAL STATION. The Saudings Central Station is now serving of consumers wired for 1,500 sixteen-camble lamps, of which about 1,500 are in constant use. The current is solid through a meter, in the same way as at the Peal Street Station in New York City. Consumers in Statings astee that they find their bills for light thiny per cent, less than they formerly were when zee was used.

SANTIAGO, CHILI. FLOUR MILL PLANT. A plant of one Z dynamo and 60 A lamps has been installed in the flour mill, house and grounds of Velazeo Brothers, at Santiago, Chili,

THE BRUSH STORAGE BATTERIES AT WILLIMANTIC.
The following interesting comments on the Brish-Swan plant at the

Willmantic Thread Works, are from a Report, Exceler 18th, 1883, by Mr. G. B. Bliss, Gen'l Supt. of the Western Ed sur Company, Chicago, of an official visit made by him the previous day at Willmantic.

The plant consists of a Brish dynamo, and Swan incandescent lamps infringing the Edison patents. The report is as follows:

"By the courtest of Mr. Scott, Superintendent of the Thread Works, and of Mr. Whitter of the Brush-Swan Company, in charge of their plant, I was permitted, as representing the Edison Company at Chicago, to examine, posterday, the installation at the Williamantic Thread Works.

The plant convises of one limbs 15 are light (2,200 c. p.) dyname, in latterier (insuced or cigit, as reported), and any 31 News langes. Two of the batteries, with say 56 langes, are in the editec building, and the other four, with say 16 langes, light one flow of one milt, the batteries being beasted in the mildle of the room. A separate hasp cloud is run from each lattery to the lamps, multiple-areed like the Elihon system.

Mr. Scott told me that the plant was not the property of his company, and that it was will taken care of and run by the Brata Swam representative, as an exhibiting plant. He declined to speak about the economy and reliability, saying that no indicator can't had been taken, and no dynamometer tests made to determine the power used by the changing Bratal dynamo, nor

The exhibit not only reprises the most constant error, Mr. White-length off the first he had not error in the relax spe for several weeks, not rear of a similar, he see his family who were only an hoose to two aways but not rear aways but present for instant hours. Learning the ways but present, for instant, one potential or least hours. Learning the ways but present, for instant, one capacity of the lamps in the unit; and half the lamps in the least instant ways over, for normal, for the what had happened I could not be a simple of the lamps o

This usefullity of the Parch Interfers was an old very from a many as a the finite children for last seen, and all over entirelets. When Improved the Interpret the Interfers of the Chicago, smething was verue, and the Chicago interfers the Chicago interfers was verue, and the Chicago interfers and the valid interfers the consumption of the Chicago in the call, and I was fell a carried the Chicago was in the learner's the Chicago in the call, and I was fell in carried the large in white the consumption of the Chicago in the call, and I was fell in carried the large in the call of ingestion accessing required by the Brobotan system.

The economy of the plant, the vital queetien after all, I pali especial attention to Mr. Scott never having made an exist of measurements, and the plant being still under the manipulation of any course my investigation was representative of the Brush-Swan Company, of course my investigation was less thorough that I had hoped, but still I learned enough, to enable me to form a decided opinion.

The four hatteries used to light one flow of the mill, are placed in the restreet of the roun. No doubt this ways thou, as any one familiar with hearn elected lighting, will use, to disminish the quantity of topped; the considered, and, correspondingly, the work to be type lasteries. But the acid funes arising from the hatteries are discoverable and uniheality. Mr. South space of this particularly, and usual the latteries would predudy use le ableved to remain in their present position except temporarily, voting to the alchemic position category temporarily, voting to the alchemic position category temporarily would not the temporarily would be the present position except temporarily would not the desired from the acid.

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Beside other fames, there as a very basigreatic news. While the system is not brough the latteries, it can be some plany like and in the distant now where the latteries are incurred, than is the dyname overs itself. This levery depletionally, and an other processing a subsequent of the latteries are incurred as a subsequent of the latteries of the dyname which is based as a subsequent of the dyname which is based as a subsequent of the dyname which is based as the dyname being which permeates the channels of subsequent as a subsequent of the dyname. The dyname being which permeates the channels of subsequent in the lattery, and letwern unhealthy gaves and disagreeable nides, little by Storage Unteress are made and the subsequent of the subsequent resolution of the object of the water resolution of the subsequent of the subsequent in the lattery resolution of the subsequent of the subsequent resolution of the subsequent of the subsequent resolution of the subsequent of the subsequent resolution resolution resolution resolution resolution resolution resolution resolution res

The important question whether the dynamos are recognical. I investigated as thoroughly as Leonid. Mr. Scott stated that the Brush-Swan Co. claim that the t8-arc-light-dynamo at Willimantic, each lamp giving 2000 candles, is capable of charging 8 storage batteries in 7 % hours, and that from each of them furty 16-camble lamps can be burned for 4 hours. As a fact, however, only 6 storage batteries, not 8, have been sent there. I cannot reconcile this claim with my personal observation and with the facts presented Their launs resistance, but, is claimed to be to ohms. They also claim that it is possible to long from each battery 40 langs for 4 hours, or 160 lamps one hour, both with the same coronny. Himmating the combactivity of the wises, which is in their favor, the external circuit with 40 lamps would measure seventy-free one-hundredths of an olon, consequently, the internal resistance of the lattery being 414 ohms, a large part of the current must be used in overcoming such internal resistance, and not more than one seventh is available for lighting. If a larger number of lamps is put on one battery, this loss is increased, and it is evident that the availability of the battery is in the threetion of a few langes burning from each lattery This, however, would make the cost of the batteries enormous, in do even unlinary lighting. Hence, ordinarily speaking, the batteries camen be introduced into practical use,

The day I was at Williamskin, the dynamo need for clargich; the stages, the stage sharines, being me by where power, was expected continuously throughout the day while the sulf was running, up as the how when fully due as required, the day while the sulf was running, up as the how when fully due as required, again at one p. m., and the dynamo was run all this other, the contents when again at one p. m., and the dynamo was run all this other, in connection while the lasteties, which were not then being now, and p. 1.5 p. m., when it was whilehold on to the zer fights, and the strange hatterner was fainthously on which the sulface of the content of the content of the content of the strange of the trange planting on the right host, was 9,5 hours. The Swan changing the through planting on the right host, was 9,5 hours. The Swan Laupen in the mill haused nor only about an lowe, log-fining at g, g, g, g, and thereby stacking of the time better, better by stacking for this pairs, with the log policy in the radie of log-law an inference), branch from g, g (iff $0.5, g \sim g$ bown, marking g to laupe house). We Oblitical value that the null light were braining at 16 calleds, and those he the trick I lumbing at 20 securities; but as the reweil of a large experience in hierarchic cell friends for all pairs of pairs of g (large with him, we great the radii light) beared at δ to called a south resolution at the cell light's bound at δ candid to a difference of g (large g) and g) are correctly. These of g (large phorm at δ 3 such g, were opportable of g), confidences, with g (large g) and g) and g (large g) and g) and g).

From information and personal observation, at Williamatic and closs here, on the form of that To horse-power are meted to run the Hunds (Baze-light-dynams, the fit Barus) ledge at roundally 2,000 c. p., each. On the try history one dynams of this type was run of flower to charge the latteries, but even then it had not had time roungly to drange all six latteries. Duly for were charged but days, and I was told that this had been the experience for several days.

Now, to compare these figures with the economy of the Ralion Light, which by the way has been in two at the same mild for meally two persyl, at a very low colinate top burse-power applied to an Rilison dynamo will yield six to catalle lumps per lower power, which is equivalent to 1,152 haupchouse, as 15,252 candle low.

It is therefore me omittion that the Broads Sains Strong Man 1, and 1.

18,730 cmild-hours.
It is therefore up-opinion that the Brush-Swan Storage Plant at the Willimantic Mill is yielding a return in light of less than 13 per rent, of the noclaims descript applied at the dynamo, and of not more than 15 per cent, of the rent to the obtained from the usual Edison Plant.

Mr. Scott stated that the Edison Plant in their mills had been working perfectly for two years, even running more lights all the time than the nominal capacity of the dynamo.

I was told that the Brush-Sean Company perform to charge their harries with a 4,000 and the power courts, and that they instead to shange the present dyname having a 2,000 caralle current, to now with a 4,000 caralle current. This is an unportant fata, showing that practical particle have falled for blush of the Brush-Sean CoS* expectations, who are now extinctly discovering the fat that how tention quantity currents are more counseful in charging strange furtheries than high tension. But a take how tendosi insulves a larger outly for conductors that high tension, nor of their principal claims

for economy, viz: until conductors, is lost.

Mr. Whittler tabl me that when one of the storage batteries is fully charged, resistance is introduced in the circuit to take its place. This of course wastes power, and it another blow to the economy of the system.

The Brush switches for automatically cutting out the batteries when charged, struck me as being very crudely constructed. Carlon points are

used, making contacts which had evidently aread, and I understand that these witches have not always acted, on occasion the batteries having discharged themselves without doing work in the lamp circuit.

Law ejvern a great dead of unity and tought to the object of Storage Balarieries, telleving that if unds a thing as a partical, consomment storage balage and the decised, it would be a vihable adjust to incondescent lighting, her y correction it, from all that I have seen and learned, that although storage latteries are a now, interesting by for annoting experiments, they are entirely unit, both scientifically and commercially, for practical use."

ANNUAL STOCKHOLDER'S MEETINO. EDISON ELEC-TRO LIGHT OORPANY. OFFICERS ELECTED, ANNUAL REPORT. The Fifth Annual Meeting of the Stockholders of the Edison Electric Eight Company was held at the office of the Company, No. 65 Fifth Arenne, N. Y. City, October 25th, 1853. The Glowing Officers and Directors were electred for the downing centre of Edward Officers, N. F. Edward, N. P. S. Hachings, Directors, Norsin Geon, S. R. Edwar, Uver President, Behrand H. Johnson, J. Hosd-Winght, Henry Villard, James H. Braicer, Calon Gent, S. R. Edward, G. P. Lovers, Thomas A. Edison, D. Hosd-Winght, Henry Villard, James H. Braicer, Calon Gehra, D. Edward, Edward D. Adams, Ambury J. Thomas, J. F. de Navaro, Edward H. Johnson and My. H. Mealowerfor. The Biologica Annual Report of the Board of Directors, provided for in the By-Laws, was submissifed to the meeting:

"To THE STOCKHOLDERS OF THE EDISON ELECTRIC LIGHT COMPANY:

Now I based of Devices edice in express their congradations require forcing against an electropass of the Collegary and bring the part grant. It was an answered at the last animal meeting that the action part grant. It was an answered at the last animal meeting that the action of the rest period that the grant grant

and experiments which will no doubt result, as increasing, in gening one company per great endantages, Joshico from all the pick, and seem certain expectably from what has occurred during the last part, it seems certain condensation of the properties of the properties of the properties of the condensation of the properties of the properties of the properties of the later transled such a stage of perfection, both its air connomical and later transled such a stage of perfection, both its air connomical and later transled such as tage of perfection, both its air connomical area. In the properties of th

But these improvements, and the large development of the business otherwise made, have been attended with considerable capense. Your Board have deemed it had policy to place a fixed limit on expenditures, especially on three connected with new inventions and experiments, and the result has been that the cost of nozintaining and developing the business has been large. In order to meet the liabilities and future necessities of the Company, the capital stock has recently been increased, from \$720,000 to \$1,080,000. This increase was made by direction of the stockholders at a special meeting held at the office of the Company on the 24th of September, 1883. Thus far only 30 per cent, of this increased stock has been called in, which is probably sufficient to discharge every indebtedness against the Company, levides having a small margin for current expenses. However, should tro tun changes now under discussion be made regarding the Canadian and South American business, it may be necessary to call in additional assessments, but otherwise, your Board are of the opinion that a long time will clapse before all will be required.

The Edison Electric Bluminating Company of New York City finished its First District a year ago last August and the dynamos were started for the tirst time in the Pearl Street Station, in that District, on the 4th of September, 1882. Since that time the station has been running and fornishing light absolutely without a moments stop night or day. For several months after the station was started no charge was made for the light furnished to consussers, because Mr. Edison was continually making changes and improvements, without, however, interfering with the current; and the Illium Company wished to avoid being tied up by contracts to furnish light, notil after Mr. Edison had entirely completed his observation of this first experiment of lighting a large district from a central station. It was accordingly nearly February before light was actually sold, and it was a month or two later before the system of regular monthly meter records, and of collecting monthly bills for the light, was fully mangarated. The number of custo has steadily increased each mouth, as appears from the following statement prepared from the books of the Illuminating Companys

DAT	Υ.,		SUMERS.	Louis is Use.	TAMES WORFD FOR		
October	141, 1NN2	En f	ustomers	1,2%4	1,626		
November	111, 1882	91	14	1,704	2,468		
December	141, 1882	203		3,144	4,838		
January	1st, (88)	231		3,477	G 128		
February	141, 1883	302		4-131	6,161		
March	144, 1883	174		4331	6,596		
April	151, 1883	161	.,	4.884	7.871		
May	184, 1883	186		5,574	8,581		
June	14, 1883	410	**	6,466	10,268		
July	161, 1883	416*		7,429	10,100		
August	1st, 1883	441*	.,	7,016	10.920		
September	1st, 1583	455	.,	8,218	11,192		
October	1st, 1881	472		8,573	11,555		
October 1	7th, 1883	502		9,811	12,379		

*The reason for the deference between these begans and those in the 19th Halletin is that complete reports had not been made at the time of going to press.

The capacity of the station is now taxed nearly to its namest, in order to open of the cleanand for the light from existing vanours; and lot for new our owners are not being connected. Mr. Eldien, however, neage-off in making creation newly invented changes in the dynamic, which it succeeding will are, meant the capacity of early present making, thereby admitting of supplying additional contours without further outlay. But as matters stund to day, the demand for the light exceeds the supply.

In this connection it is gratifying to recall wonething of the history of the great achievement which this commercial success implies. In 1879, a select committee of the British House of Commons called before it many of the first scientific men of Great Britain who unanimously declared their disheliet in the possibility of any subdivision of the electric light with economy. At this moment Mr. Edison, who had already accomplished this subdivision on principles which he believed were capable of economical application, was engagest in his faboratory upon the great and complex task which he had set for himself. That task was to dryise and put in successful operation commercially, a system by which electrical currents could be generated and distributed from a central place to all the houses in a town or other given area, there to be without slanger or Inconvenience turned by the householder at will luto a light, healthful and agreeable to the eye, in quantity suitable to domestic habits and necessities, and for a price which the consumer wantil he able rud willing to pay, and which would return a satisfactory profit to the investor. This task in all its conditions has been accomplished, and the first central station is now regularly lighting its district at a profit which should enable it to pay a small dividend upon its capital early in the coming year,

The general growth and development of the business during the past year, as stated at the beginning of this report, has been satisfactory. Marked progress in every direction has been made. Beginning with the dynamo, and ending with the house fixtures, and the lamp, including the meter, conductors, safety appliances and other important mechanical details, there have been improvements everywhere, and one of the most gratifying facts is that not only has the efficiency of the Falson System been continuously perfected, but the cost has been decreased. Our acknowlegments are doe not only to Mr. Edison, who has continued to serve the Company with the same ontring real and great ability that he has always displayed, but also to his assistants. to whom your Trustees gladly take this occasion of expressing their high recognition of their efforts. Judging from the progress that has been made during the last year, it would not be extravagant to expect ental progress. as regards the efficiency and economy of the apparatus, during the year to come, thereby giving the Company still turther advantages, in addition to those already obtained, to compete with gas and all other existing artificial lights

No especial progress has been made with the Edison Electric Railway since the last annual meeting. The development of the Edison Light, with its attendant demands upon Mr. Edison's time and thought, has left him no leisure for perfecting the details of his System of Electric Railways. Meantime, however, other inventors, adopting to a more or less extent Mr. Edison's line of inventions, were, it was found, developing rival systems, and were enlisting capital and business men in their enterprises; and your directors, recognizing that fact, were accordingly disposed to consider certain overtures made in April last towards consolidating the Edison Electric Railway business with that of another organization. This resulted, May 18th, 1883, in the formation of a new company, called The Electric Railway Company of The United States, to which the electric railway patents of Mr. Elison, and those of Mr. Stephen P. Field of New York City, have been assigned, both interests receiving in payment a large share of the stock of the new company. In order to relieve the officers of The Edison Electric Light Company, and Mr. Edlson, from the details both of business management and of electrical supervision, it was agreed that the Field Interest should assume entire charge of all the insiness details of this new company, together with those relating to electrical development. The new company proposes to develop as rapidly as possible a complete railway system for practical use. Sufficient thue has not yet elapsed to enable this plan to be yet carried out, consequently your directors have nothing further to report than the completion of the preliminary arrangement 45

The formation of the Edison Co. for bolated Lighting was referred to in the last annual report. The contract between that company and the Edison Electric Light Co. was executed April 26th, 1882, the capital stock having been fixed at \$500,000, of which \$255,000 of fully paid unassessable stock was issued to the l'dison Electric Light Co. on account of a license, and the balance was sold at par for eash, to raise money for carrying on the business. The growth of the business exceeded anticipation, and, in order to fill orders promptly and carry a necessary stock of apparatus, additional capital was required. The capital was accordingly increased from \$500,000 to \$1,000,000 by a vote of the vio. kholders of that company at a meeting light December 30, 1882. Fifty one one handredths of this increased capital was, in accordance with the contract, round to the Edison Electric Light Co., and the balance of the stock was used for raising additional money, but thus far only fifty per cent, of the par value of the increase has been valled in. The Isolated Company carried a land-once profit on its lusiness during the first year of its existance, out of which \$50,000 was set aside for a to per cent, dwidend on its stock, paid January 20th, 1853. The business of the second year, now current, compares favorably with that of the first year. The lusiness of the Isolated Co. may be considered as firmly established on a dividend paying basis, and the future prospects for enlarged profits and increased dividends are very gratifying. Up to the present time the total number of installations made, amounts to 256 plants, aggregating 101,366

The consolidation of the prominent electric light companies, including our own, into one interest, is a subject which has been frequently pressed upon our attention during the year. Every electric light company in the country, of any prominence, has manifested a willinguess, and several have made orgent overtores to us, to amalgamate. All intimations of this kind we have court consty received and carefully examined, but in no case have your Board con sidered it for the interests of our Company to give any encouragement Not only, we believe, do the Edison patents, as matter of law, endow our Company with a monopoly of incamlescent lighting, but, aside from patents, our business has obtained such a start, one so far in advance of all competitors, and the record of our installations has been so uniformly successful, that the business ascendency which we have acquired is of itself sufficient, certainly for the present, to give us a practical monopoly. The one or two aspirants to the coveted position of being our competitors have thus far failed to make themselves felt by us enough to make it worth while for our Company, in the opinion of your Board, either to yo to the expense of bringing salts for infringement, or to take other especial steps, aside from those of a purely business teature, to secure the advantages of our position. A local survey of the subject, at the present time, convinces your Board that without going to the expense of litigation our Company will be able, from the enormous start and

as above set forth.

Indices advantage it has already sopieth, not open and use by a tile land, in the late of tensities is partical landes amongle.) It must be admitted that this through his not been applied without gent interes at sufficient feetbook and the late of the late o

Neveral vulnerlineir comparine, licensed by our Company, had been mented prior to the ist annual mereline. The week (1) The Elvison Review Handstade, Company, at New York City, (2) The Elvison Company for Handstade, Company of the City of Stategos, Chilic and (3), The Eldon Benesitation, Company of the City of Stategos, Chilic and (3), The Eldon Elvis of Homes company of the City of Stategos, Chilic and (3), The Eldon Sear of these companies has hardealy been received be in this report. The other there have also become well candidated during the past year, and are now as Stategos, modelled on that of the First Dolkin in this strip, is rooming with success, the Lawrence Company is now engaged in quadrupline quite final of the totology, while the Chicago Company, which has laready done partners for the Malathian of central tailors plants, expenses on making preparations for the Malathian of central tailors plants.

Issules the saturdinate forence companies above named, several other scal companies have been formed, and others are now just completing their organizations. Those already formed are for the following cities, severally, vii. linecktum, Maxy, Stamouklu, P.; Smibury, P.; Ela River, Maxy, Davesport, Iowa; Appletim, Wis; Wilkinwyort, Pa; and, in addition to these, companies in other cities are now being formed.

The central station installation of some of the companies mentioned active, will health earlier confection on poles, constituting what is known in our business as Village Plants. These companies are full self promise for the fourt, and it is confediently helevent that, from the first, they will all pay adequate dividends supon the liveralment. The capital has in every limitative, from the confedient plant of the extension of the confedient plant of the extension of the confedient of the extension of necks than the Edition Extension Light Company and the excendation of necks than

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paid, now and in the future, will intinately create a large dividend paying fund for our Company.

As our Instiness of Central Station lighting has developed, we have discovered that there are a large number of towns and villages where, owing chiefly to the fact that the houses are largely scattered, the system of distributing the current by underground conductors is apt to be expensive and cumbersome. In order to meet the peculiar conditions of this large class of cases, and to meet the demands for the light in villages, Mr. Edison has perfected a simple and comparatively inexpensive method of Central Station lighting adapted to communities where buildings are not compact and residences are widely distributed. This is called the Village System in contradistinction to our City Underground System, such as is in use in New York City. Those Village Systems, where the current is distributed above the ground by means of pole lines, have proved entirely successful, and that branch of our business is being developed with great rapidity. The first plant of this kind was an experimental one, installed at Roselle, New Jersey, at the joint expense of the Edison Electric Light Co. and the Isolated Co., the authority for the installation having been granted, by the Light Co , at a meeting of its Directors, July 7th, 1882. This plant was installed, and light furnished to consumers throughout the town of Roselle, the fills being made out on the meter records, for several months, in order to enable your Directors to become fully satisfied touching the merits of village plants. As a comsequence, the business having first been thoroughly tested at our expense as alsove set forth, permission was granted to several subordinate, licenser companies, notably the two organizations at Shamokin and Sunbury, to install similar village plants, and contracts for additional installations are now in hand for fifteen other towns. One improvement introduced by Mr. Edison in the Village Systems, since the Roselle installation was made, is worthy of especial notice. At Roselle, the lamps were placed in series of three, all being necessarily turned on or off at the same time, but since that installation was made Mr. Edison has changed this feature so that the lamps in the Village Plants, are now turned on and off singly, the same as in the usual city central station plants.

From the above nationent, it will be seen that in the rapid and secrecion development of the instances of Indeated Lighten, the larger and seating some valuable beams of our business across as Central Schitzen Lighten, has not valuable from the other schitzens and the control of the control

In the Report submitted at the last annual meeting, attention was called the subject of the manufacture of apparatus under our patents. This highly important question has received a great deal of thought and disnosion by your B-ard, and more especially by the Executive Committee, but no change has been made from the policy la vogue one year ago, which has thus far proved satisfactory to the company and to Mr. Edison. All the manufacturing is still being done by the same outside shops that were engaged in doing it at the last animal meeting, and your Board, while entertaining no doubt that oltimately this matter will require recasting, find it inespedient to disturb the existing arrangements, certainly for the present. It should be remembered that our Company was organized primarily for the purpose of paying the expense of Mr. Edison's experiments touching electric light, heat and power, and to take title to bis inventions and patents. As yet no provision was ever made for this Company itself to conduct the business of manufacturing, and no capital has ever been raised for that purpose. In lact, the policy of the Company has thus far been merely to perform the duties of owner of the Edison patents, and to derive occome from licenses and royalties thereonder. In this respect, the policy of our Company is peculiar, all the various electric are light companies. with possibly one exception, being the owners and managers of their manufacturing business. There can be no doubt that hereafter the business of manufacturing the vast variety of apparatus incidental to complete instal lations of the Libson System, will be one of magnitude and a source of great profit, besides requiring large capital. Whether this Company will iself provide capital for this vast business; or whether it will adopt the policy, which it has not yet done, of giving exclusive licenses on condition of royalties being pold by the manufacturers; or, again, whether it will throw open the field to all first-class manufacturers, granting licenses to all on equal conditions, are important questions which will unfouldedly demand consideratum and decision at the hands of your new Board before the close of another year,

Gonstrein, at the peculiar elementaries attending counteraring he contention with one limited, so the present time, your bload has developed to proceed the content of the content of the content of the contention with one limited processes and content of the samufacturing leads to known type that he processed and content of the samufacturing leads. Meantine, valuable experience is being gained, so that when the suscesslates are sufficiently and the comparating of the comparating of the processes of the content of the comparating of the comparating of the top the content of the content of the comparating of the top the content of the content of the comparating of the end-open are now as all it is of the surnous importance that the content of the content The Irlinging of mits against utilingers of the Ethion Tatests is a subject which has frequency occupied our attention along the prays. The polery than far acted upon, but which may be changed at any moment when our assertime seen to require it, has been adeed postcoil upon abore. Formal notices of inflingment, in order to leftly preserve on legal rights, have been concerned inflingment, in order to leftly preserve on legal rights, have been continued to the continued of the co

New inventions of great value are still being made by Mr. Edons. Two of his most valuable inventions in contenties with our basiness, both in a scientific and commercial aspect, have been perfected during the pass year. Two more, also of great excounts (state, are nos in progress of completion. All of these inventions have been turned over to our company by Mr. Eldon. The butta member of applications for pattern than for feel by lims in the local manner of applications for pattern than for a feel by lims in the local partial of the progress of the feel of the pattern of the feel of partials. Hen for great amounts of the partial of the feel of the feel of the pattern of the progress of the Gorgion.

The Canalian lantines has had especial amonius shoung the year. Several intents plants have already laven induced in stouries in its country, refers are expected for others, and there are guitating melantion shall assume or extend attaining plants with the level proof. Owng to the amount or extend attaining plants with the level plants of the plants

Creating and America large number of pattern, conceined and exclusive an

asset to grant.

The financial condition of the Company is fully set forth in the Treasurer's report herewith submitted. Large sums of money have been spect in earns, new Invention and patents; also considerable amounts in developing the business in body Canada and South Auerica. Your Board have con-

silered in names to persuposity limit the expenditures in new membras, and hamper the development of the louthers by unreascable consony. On the whole, surveying, the expenditures from the formation of the Company for the present there, the outly has not bleen excessed, and your Earli adequate reason for congratulation in the fact that no expensive mistakes have been much, and that, generally specialic, full value has been received for

In conclusor, we will say that the ublimate success of our banness in holinger an open question, and that it is entitled within the Lounds of safety to predict that before the close of another year the public at large will fully recognise the fact, now fromfanly admirted by all who have investigated it, that the Edison System of Incandescent Lighting is destined to suppliant all other methods of artificial Blaminations.

DANGER FROM GAS. An explosion of gas occurred in the green-room of the Ambigu Theatre, Paris, on April 25th, by which twenty persons were injured. . . On April 26th, Richard McGrann was found in his bedroom at the City Hotel, Lancaster, Pa., unconscious, the room being tilled with gas which was flowing from the binner. . . . James McGrath and wife were found insensible in hed at a hotel in Scranton, Pa., April 35th, the room being filled with escaping gas. It was said by the doctors that Mrs. McGrath could not live. . . At the glue works of Baeder, Adamson & Co., Port Richmond, Philadelphia, a gas buoy exploded. A workman named Charles Austin, had his right leg torn off hy the explosion. * * * Stewart Vanderbilt was found unconscious in his room at the Gerver House, Easton, Pa., May 4th, having been overcome by escaping gas. His recovery was uncertain, . . . On May 14th, Annie P. Lucas and Sallie Rue were found unconscious on the floor of their hedroom at the residence of Joseph S. Lucas, Baltimore, suffocated by escaping gas. * * * A. S. Gurner of Wareham, Mass., was found in his stateroom on the Fall River Steamer "Bristol," on May 15th, suffocated by illuminating gas which was escaping from the burner. * * * An explosion of escaping gas occurred on May 22d in the assessors' room at the City

Hall, Holyoke, Mass., by which about \$200 worth of property was destroyed. A heavy black-walnut door was torn from its hinges and demolished, and portions of the heavy wood-work were hurled some distance. A gas-fitter, named Arthur M. June, was severely injured. . . . Somebody let a programme drop from the halcony of the Grand Opera House a few months ago, while Mary Anderson and her company were playing "Romeo and Juliet." It fell into one of the gas globes and caught fire. As the flame streamed up several ladies rose to their feet and one or two screams were heard. Instantly there was a hubbub in the house. Some one shouted "Sit down there's no danger." 'The paper had burned itself out and the excitement ended. . . . On June 28th, an explosion of gas occured at 333 Haves St., San Francisco, Cal. Two men were severely injured; the store front of the building was torn out, and considerable damage done. . . . An explosion of gas occurred August 27th, at the Wapping Gas Works, England, whereby three men were injured. . . . On October 25th, while the gas was being drawn off from a tank at a hotel at Woodsburg, an explosion occurred by which several persons were injured, and property worth \$5,000 was destroyed.

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No. 21.

TWENTY-FIRST BULLETIN.

The Edison Electric Light Company,

New York, December (8th, 1883.

(These bulletins, originally issued as a convenient way of answering the inquarts of distant agents, are now, in response to summons requests, sent also to all stacksholders, to give them information of the progress of the company, and of other matters of greater of less interest connected with electric Sgiding. Agents are particularly requested to communicate to the Procident whatever precision points of general interest may be developed to their experience in installing or operating our light, the

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These papers on the Brush Storage Battery, and the Swan Lamp Patents, are printed for the information of our agents and stockholders. They are so voluminous we are obliged to devote an entire Bulletin to them, omitting the usual record of the growth of our business.

The failure of the Brush-Swan Company to redeem their prom-

ises, made periodically for the last eighteen months, to establish an economical system of interior lighting by means of their are light plants and an incamlescent lamp, has largely extinguished the public interest in the question of storing electricity and has created a general disbelief in its practicability. It is true that they have recently installed several exhibition plants, notably in New York City and at Williamntic, but in every case these installations have either failed to give satisfaction, or have been operated not by the usual are light dynamos, as was promised, but by new apparatus especially prepared at an additional cost, the existing arc light component having been found contrary to expectation, to be unfit. This result may be disappointing to those who have made investments, but it does not surprise us. The practical availability and commercial value of storage were thoroughly explored by Mr. Edison early in his experaments in incandescent lighting, and the conclusion he then announced, that secondary batteries cannot be employed with economy and compercial success, has been verified.

Three of the full-wing pages have appeared in previous unnessed the fulletin. Those of Mr. Borden and Mr. Paine are now printed for the first time. The latter is of peruliar interest, because it contains the full text of Prof. Cross's Report on the Brash-Sawa experimental storage plant at the Massachuetts Institute of Technology, Buston, almost which a good deal has been said in New Braghand. We believe that all of those papers, taken together, constitute the most accurate and complete presentation yet published of the subjects discussed, and that our agent will find them of great value in meeting the erroneous, not to say sensational, statements almost the British-Swan storage system, now being multiple for the subjects discussed.

MR. PAINE'S PAPER

For more than two years the subject of the storage of electrical curray has been before the public, and the interest has been intensified by two revent elikulisms of the storage system (so called) at the Willmantic Linen Company, in Connecticut. Appreciating this interest, Mr. Ihrish, in 1885, promised shortly to put upon the market an apparatus wherely this great desileratum could be obtained, but not until August of the present year, was this apparatus forthcoming.

Assurated by a desire to control the system in Brisial County, Mass, a tempory of gentlemen, under the main sof the "Tamiton Syndicate," obtained from the Brasil Company the reducal for the retrievy, and are now negotiating for the control of Neabuighand. In order to accretian the ments of the system, they submitted the circular, issued by the Brasil-Company, and one of the twenty-light Brasils batteries to Prof. Class, R. Cross, of the Massachusetts Institute of Technology, who has made in claborate report, a copy of which is given below.

"REPORT OF PROF. CHARLES R. CROSS OF EXPERIMENTS WITH THE BRUSH STORAGE BALLERY, JULY-AUGUST, 1889."

. .

A No. 3 twenty-light Brash Storage Battery of twenty four cells was out to me from the factory of the Brash Electric Co. at Cleveland, and begether with the "manipulation" and animher of Swent transferent lamps was suffidly finishled in the laboratory of the Massachusetts Institute of Technology, Buston.

The battery and lamps were set up and connected with the dynamic machine by Mr. Nicolans, a gentleman detailed by the Brush t is, for the

The latery was composed of four troughs containing four cells each, and two separate cells, this division allowing any messays sharped in the service services of the containing early supported to the end of a scheduler. The arights of one of the single cells was type the, and that of the white the containing meeting the cells was therefore sometime, maker expectation of one of the single cells was type the, and that of the white heaving four exits was therefore sometimely maker expect these, where the weight of the toughts of three or four cells is somewhat less in proportion that of the visible cell.

Here exist a Santa Lamps of different resistants were familised from the factor of the Brobsson Yan, of shift the set having the lighter testant egas the next said along results in up perfinition; experiments, it is record vary desirable to ratal a specify dischoin regarding the work of the lattery, this set of thomps was used and the sour ending testward of the lattery, this set of thomps was used and the sour ending testward the lattery and lamps was used and the sour ending tesfore resistant. Whis sourter can reversely like tested, bowers, this any place where the lattery and lamps are used. The lattery saw charged by the urnout familials by No. P. Julius broadly damants making, finnishing a versured whose was resulted, along the latter was the latter than the latter of the latter was the latter of the

Although this is perhaps a somewhat severe duty for a two-light machine to perform, there was no difficulty in keeping the arc-light at what was, so far as ordinary observation could slow, its normal brilliancy. During those operations of charging that were carried on in the night-time, the are light served to illuminate the room in which the engine and dynamo were placed. It was not considered necessary to measure the power consumed in running the dynamo, as this is well-known. With a current of eight amperes this is stated in the Brush Company's "circular" to be one and three-fourths loase power. With the nine ampere current used in my experiments, the power would probably be a little under two horse power, I found that with slight instructions as to the dynamo and lamp, an ordinary engineer could take the whole care of the charging of the battery, as the "manipulator" never failed to perform its proper function of automatically throwing the lattery into or out of the circuit on starting or stopping the dynamo machine. That part of the "manipulator" which is designed to throw the battery out of circuit when charged, was not used by me in my experiments, as with a two-light Brush machine of the pattern which I have, the throwing of the battery out of circuit by it would short-circuit the mathine, and if through inadvertence of the attendant in charge this change was not nothed, the machine would be injured by the abnormally strong

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current that would be produced under those chemistances; with the larger hardy dynamic, such as would be used in practice for charging the hatteries, as deforgulating device is promised by which the current given by the machine is rendered constant whether the hattery is in or and of the circ. In. The meter connected with the manipulaton was found, when the circle was properly regulated, in familia a covery register of the time duigo which the current entered the latter is the process of charging.

Since the current is pacifically constant in strength, the amount of electricity entering the hattery is kumans. From this, in connection with a knowledge of the variation in the electromotive force of the buttery as its charge approaches completion, the actual electrical away prequired technage the lattery can realily be fundal, if theirsel, once for all.

After the leattery was set up it was put in proper condition for use by prolonged charging. The necessity for this arises from the chemical changes which take place in the battery-plates, incident to drying and exposure to the air in transportation. These changes do not occur quently when the battery is left to itself, since the liquid which has been placed in cells covers the plates, and thus protests them from the oxidizing effects of the sin. Oning to an absolute want of knowledge as to the length of time necessary to put the cells in proper condition, a considerable time was spent lief or this nas arroughtshot. The lamps used are intended to give their normal light when run with a leatery or dynamo of thirtyeight volts electromotive force. The resistance when ran under these conditions, that is, when heated to their proper temperature, is about thirty. eight ohus, and the current traversing each is approximately one ampere. Experiment showed that twenty-one cells of the lattery furnished the proper electromotive force and current for the lamps, a smaller number giving too little light, while a larger number gave, together with an excessive brilliancy, a current so strong as to endanger the long life of the carison filaments of the Lumps, and also to shorten correspondingly the time shiring which the lattery could keep the bings at a proper degree of incandescence. This number of cells, twenty-one, was accordingly used in the

The point which I has been expectably required to examine and to extend and the outton time immediate, are, (1) which quantity of schridity is necessary to fully change the Bresh temptigist storage better, and (1) when this control of the point which is a small colling of the state of the point of the "critical to a label control of the point of the point of the point of the point of the special colling of the point of the point

(1) The figures given on page 1 of the circular are so related that a emination of one series is sufficient for all. The statement is there made that a current of eight amperes as furnished by a No. 3 Brush two-light machine, will charge two forts light storage batteries of twenty to twentytwo cells cach in twenty-from hours. The current being the same, eight amperes, it would also take the same time to charge one forty-light latters (as the latteries are placed in series), and one-half the time, or twelve hours to charge a twenty-light buttery, as the plates of the latter are only half as large as those of the former, and there is only half the work to be done within the lattery to charge it. A corrent of different strength will charge the batters in a proportional time, since the time required to charge it dopends only upon the actual quantity of electricity passing through it Where no regulating device is used with the dynamo, the corrent in practice and especially with a small machine, varies slightly in strength during the time of charging, partly from accidental causes, partly from the rise in e'ectromotive force of the luttery uself by the charge approaches completion. Thence in any test, the actual amount of chestroaty entering the batters during the whole operation of charging must be ascertained

I have paid especial attention to the charging of the battery in two sets of experiments. Until 1 had bearned from experience to know from the milications of my eloctrical instruments, when the battery was no sierle changed, there was no certain means of determinant this, so that in the test of the experiments now under consideration I prolonged the duration of the charging current somewhat longer than was necessary. In this case the charging current was continued for ten hours filty-seven minutes, us average value being slightly over \$2 amperes, and the total amount of clotricity was trees angere hours, the ampère hour being the amount of electricity familished by a current of one anapere during one hour; were the current strength to have been eight amperes only, this would imply a duration of 12.66 hours (twelve hours thirty-four mountes). From a comparison of the readings of my instruments or this case with thrit readings in later experiments. I am led to conclude that the lattery was really charged about twenty minutes before I stopped the charging current. This would tobace the value of the charge to 96.9 ampère hours, which with a current of eight amperes would require 12.11 hours, or twelve hours seven minutes to complete the charging.

In the second case the charging current was continued for ten locustive minutes, and the amount of electricity was 92,2 anyper hours. The soudd require a abration of 1.18 hours, or several hours, forty-eight minutes with a current of digit angivers. In both these experiments, the limit was found to be fully charged by the succeeding tests with invanies seen lamps, as well as by the electricity measurements.

The "circular" considers a cutrent of eight amperes continued for

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twelve hours, or ninety-six ampere hours, to be necessary for complex charging.

(a) The ability of the batter to funds the account ground to the meantweat large secreted plat do single inflored; as of clif Siam inscanderent large, resulty tensely in number, under the time during white furnished a parce [data and accounting frost time to limit the artistic funds of the large, as well as beging a record of the carbinosis in the certain and determined before their distribution to the content and determined before the distribution to the carbon state of the light furnished by the large, out of these was musticle and the content of the large for the distribution of the large was also as the content of the large for the large state of the large for the large state of the large state of the large for the large state of the large state of the large for the large states. If a mind confidence in the content of the reading states, if a mind confidence in account of a my partial cliff time. As of the large states is the large states of the la

Trem the various measurements under at different times during the time of discharge, the servinge could power for that time not determined. The particular long need use changed from time to rice to nice sure that the illuminating power of the different longs rise substantially the some, which was found to be the case.

It ought to be consided that many fights both incomes out lamp, and gas lights which are considered to be of sixtenaminals power, will coully full about of this value if actually incomed. In facilities I control the to-downg results, the lamps extremely being in only as a run for four libers, and the actuage coulder power doing that must brings to forms.

A shift is twa also made, in which the a tod plecometric measures most over some contrast over a factor in modification p as account of vow the finish is with the approachs, but in which the electrical staticities were about identical with those of the found test, and flexour k the algorithm of the factor in the finish mode of the analysis of the factor in the treet following the trianges of no times with wive ministers and true treet factor in the same k to the same

The average candle power of the lamps do ing the first three hours of the tests was as follows:

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	(2)																		t	7.	ť
	(3)																		ı	ţ.	4
	(4)										d	÷					è		2	4	t

The randle power was at sixteen after the following times from beginning (1) two and one-fourth hours; (2) one and three-fourths hours; (3) two and one-fourth hours; (4) three hours.

I think that with more extended experiments it would be possible to positive Swan lamps which would give even still more satisfactory results when run in connection with the lattery than those employed in my experiments. A most interesting and satisfactory test was made as to the time during which the lattery would keep a smaller number of lamps than taenty up to their normal brilliancy. The battery was charged as usual, and discharged through ten incandescent lamps, the same measurements being made as in previous tests. At the end of ten hours of continuous running the light of the lamps being still above twelve candle power each, the experiment was terminated. The average candle-power during those ten hours was 15.3, and the brilliancy was above sixteen-candle power until about eight and one-half hours from the beginning. The average candle power during the test nine hours was 18.8. This result is particularly interesting as it shows the action of the hattery when used as it would be in cases where only a portion of the maximum possible number of lamps are generally used at any one time.

Besides the foregoing matters there is another important land evident psynharity of the Brush storage leattery that demands notice, it is exceednigh important that the electromotive force of the battery shall diminish as slightly as possible during the whole practicable run, and that it should fall of notably only at the cod of that time. Any decrease in the electromotive force causes a diminution in the current, and hence in the brilliancy of the lamps, both because of the smaller force urging the current through the circuit, and because of the increased resistance of the lamps when their temperature falls with the primary diminution of current due to a lessened electrometive force, thus a falling off in the electrometive force of from three to five volts with an initial electromotive force of thirty-eight volts will reduce the brightness of the lamps to a point considerably below their average value, the brilliancy falling to twelve or even ten candle-power. in the Itsish battery this falling oil occurs chiefly or often almost entirely towards the end of the operation. Thus, considering one experience which I take at random from my notes, but which is typical of all, the electromotive force of the lattery of twenty-one cells at the beginning of the discharge was 37.6 volts; at the end of one hour twelve minutes, this remained unchanged, seventeen minutes later a diminution of two-tenths of a yell had occurred; in forty-nine minutes more a further diminution of two tenths volts took place, in the next eleven minutes the electromotive force fell two-truths more, and at the expiration of three hours from the beginning. the electromotive force had diminished but nine-tenths of a volt. Huring the next and last hour of the run, the falling off was more rapid, being for

this time two value or more than twice as great as along the few planes. This is absorbed were, an their and the bours will trie lamps, in which no perceptible falling of a courred ulong the first two and there, which were the soliton of the soliton the soliton in the soliton the soliton of the soliton the soliton of the soliton the soliton of the s

Labor desire to call attention to the great elicities of the Swan incandescent lamps used by me. I fault that using use of some cells of the lasttery with an electromotic here of 17 to 60x, a current of 19 x amperes was sufficient to cause twenty Lamps to glow with a build-mary of seventeen cantile never early.

The energy expended in doing, any electrical work is found by middly fight the electronistic force expressed in works, when current expressed in another several in violation is an expressed in an expressed in an expressed with a continuous properties of which is the product disheld be seven handled a distribute growner. One electrical energy in horse process what is valid the electrical between the continuous electrical energy the distribute and an electrical energy that the continuous electrical energy field the electrical between the amount of electrical energy field in which there were no boxes of energy in further or enter-easily in the energy of the electrical between the latest electrical energy in the further or enter-easily in the energy of the electrical between the electrical between the electrical energy of the electrical energy in the electrical energy of the electrical e

The efficiency of Suk is dynamic would be in The efficiency of Suk is dynamic varieties. But sharing high dynamic is eighty sow conclusivabile. With an efection-motive force of 2.5 fe white and a current of my a superse, the ranger of the conclusivabile of the substitute of the contract of the contrac

Another valuable peculiarity of the Sown hamp deserves mustion. The poculiar shape of the rathom hamsent is such that the illumination is practically equal in all iffrections, which is not generally the rease with finanthescent lamps. I am unable at this time to insert all the results of my tests which, indicate, are not uplue completed. Date form obligated touch up this report in great based in order to secure its reception at the time assignment, and have had to here a mandate of interesting calculations income. p'ète. But the resulty relating to those points to which I was especially asked to direct my attention will, I think, be clearly understood from what I have written.

August 18, 1853.

Cites R. Censs "

Laying aside for a nument the consideration of matters not neurinoid in the report, fet is analyze this paper, making such identitions and comparisons with the Edison system as may seem proper, eare being taken that no statement he made which cannot be substantiated. The aim of this article is to instruct our readers in regard to an apparatus, which, while it has its sphere of neighbors, and will prove a most chabble addition to electrical science, is far from heing the "philosopher's stone," who h is uncustors and promoters in their cell laws ethinsel for

The writer his taken the follow system as the illustration of the "direct" system of electric lighting, not because he so connected with that company, but because after full investigation and percois connection with other companies using air and or conducting this, he was led to give in his adiguator to the Edison Company, as basing the most perfect, complete, and practical system of electric lighting.

With the desire that this article shall not be considered to be "personal" in any of its allusions, let us now proceed to the analysis of Prof. Cross' report

Prof. Cross states that of three sers of lamps which he tested, that set lawing the highest resistance, gave the most satisfactory results. This finding agrees with that of the Sult-Commission on incandescent lamps, appointed at the Paris Reterieral Richildrico in 1881. Their papert states, that "the ecomony of light production, is greater in high resistance lamps than in those of hor resistance." The Kilison lamp, of the type used in manufactories, when at system candles, has a resistance of 120 dains (units of resistance), while the type in ed in central stations has a resistance of 140 ohms. Prof. Cross finds the Swan lamp has a resistance of but 18 ohms at 16 candles.

The logical conduction of Prof. Cross' statement would, therefore, be that the Edison Lung is more commined than "be Swan, which would again coincide with the report of the Sub Commission, which State that "the critical efficiency of the four lamps, son, which State that "the critical efficiency of the four lamps, examined, expressed in Carel Juniers of 2,3 spermageric anniles excent, produced by our II. P. of current, is as bothoms, (A) at the Conduct, Produced by our II. P. of current, is as a follows, (A) at the conduct, Subson 26,5; Swan 24, Lune Fox 2,5,5; Maxim 25,4; Maxim 24,4. This factor of high re-stance lumps, well again the referred to.

We find from Prof. Cross' report, that the resistance of the Bruch latter; is about 1 gloins. This is not started in see manyarism words, but can be desline of from the figures and statements thereing given. We misst assume that this dyname was running at its mountal speed and doing its offinary work, not with one are lampy a placed in the circuit withs lamp appared to be at its sortinary. Under these dremustances, the battery most lawer replaced in mean Lamp (which has at Issa) and its sortinary in the lattery land lass resistance, the dyname would have proference of the circuit with the properties of the lattery land lass resistance, the dyname would have proference, a pump will discharge more water through a forger piece or pipe having less friction. The buttery must have on the average, at less; the resistance of one are lamp, or 3, others, We way "with the average, which will be explained latter, better

The secondary hattery follows, in one respect, the same law as other generators, in that it forms part of the virenit, and its

wi

Prof. Cross, in his experiments, used twenty lamps, each having a resistance of 36 Juns. The resistance of this outer circuit (neglectring, as these Prof. Cross, the resistance of the wirely must have been 19 Juns. This result may not be intelligible to all, let us explain it. In order to othatin the best results with incan-descent lamps, they must, as stated above, he arranged Networn the wires, with the current cannot just from one wire to the other except through the lamps, each of which forms an inde-

pendent path for the current. They are practically arranged thus:



and with twenty lamps in circuit, there would be userry paths for the carrier, and the resistance would be 1-20 of 28 olms or 150 blms, as above. The resistance of the total circuit will therefore be 3 plus 1-59—4-50 blms. As the extensis parts of a circuit "absorb" the current in direct proportion to their resistance, the lattery having 14 of the total resistance, must absorb 61-1 per eart, of the current, leaving but 388 per cent, to be utilized in the lamps. This assemption of the lattery replacing the are light by reason of its interposing an equivalent resistance would appear to be reasonable, naless there comes in some question of its counter-electromotive force which should have recognition.

The folion dyname follows the same laws, in this respect, as the lattery, but its internal resistance is extremely low, being but 0.55 of an ohm on the two hundred and fifty light machines. Each folion lamp has a resistance of 120 obus, therefore the unter circuit will have 413 or 4,8 of an ohm resistance, while the total circuit will have 415 or 4,8 of an ohm resistance, while the total circuit will have 415 or 4,8 of an ohm resistance, while the total circuit will have 415 or 4,8 of an ohm resistance, while the total circuit will have 415 or 4,95 of an ohm resistance, while the total shows an efficiency of 9p per cent. Assuming that the Hrand rhynamo has an equal efficiency (the tests at Paris, however, showed hut 2; per cent, at its best), only 9p per cent. of \$8.8 per rent, or 3,49 per cent, of the power familished by the steem engines or other moules power, will appear at the 8 wash lamps.

This efficiency, obviously, decreases as the number of lamps is increased, and increases as the number of lamps is decreased, and

Prof. Cross tells us that in his fourth test, during the four hours discharge of the battery, the r6-candle power lamp showed an average of 19.1 candles for the three hours and dropped to 13.9 candles for the fourth hour, giving an average of 17.8 candles for the four hours. This is an exceedingly bad showing for several reasons. As the life of an incandescent lamp varies inversely as the fourth power of the candle power (that is, a 16candle power lantp run up to 32-candle power, will last but onesixteenth as long as it would at 16 candles), these lamps, when run at 19.1 candles for the three hours and at 13.9 candles for the fourth hour will last but about 60 per cent, as long as they would if maintained uniformly at 16 candles. Again, the employees in any manufacturing or mercantile establishment are very sensitive about change in light, and the drop from 20 candles down to 14 would create extreme dissatisfaction. Further, a manufacturer asks for no more light than he needs. If therefore,

he axis for 16 cardles he needs that amount at diff times, and will not be contented with 14. It may be urged, as an answer, that the lastiery need be used for but three hours before being recharged; that is, but three-fourths of its charge need be drawn out before recharging. This is importainable, as the first cost of the bottery plant, already large, would thereby be increased 331 per cent, as we must use more batteries to make up the deference.

In view of what has gone before, it may be interesting and instructive to enquire why the candle power of these lamps should fall, as stated above. In examining into the efficiency of the battery, we found that "the average" resistance of the battery was colums. The expression "the average resistance," together with the changing electromotive force mentioned by Prof. Cross, gives os the explanation. As is well known, a secondary buttery when charged, consists of a plate of perovide of lead at is in the formation of this plate that we find the distinguishing feature of the Brush battery) and a plate of metallic lead, immersed in a trough of dilute subduric acid. As the battery discharges, the peroxide of lead is reduced to oxide, and the metallic lead also becomes oxidized. When both plates are thoroughly converted the battery is said to be discharged. In this condition its resistance is very high, for the oxide of lead is a very poor conductor, and acts as a shield, and as the charging current removes this shield by converting the oxide of lead on the positive plate into peroxide of lead, and reduces the oxide of lead on the negative plate to metallic lead, the internal resistance falls, and is lowest when the battery is charged. We now see why the power of the lamps is reduced as the discharge continues, for as the internal resistance increases, the battery "absorbs" more and more of the current, and a diminished amount is sent out to the lamps; in

other words, the efficiency of the hattery decreases as the discharge continues,

Prof. Cross states, that inasmuch as the resistance of each lamp is but 38 ohms, and the hattery has an electromotive force (or electrical pressure) of 37.6 units, he obtains more than 20 lamps of 17.0 candle power each, or 340.0 randles per electrical horse nower. This is an astonishing result, inasmuch as the Sub-Commission, above alluded to, could obtain but 177.92 candles per electrical horse power from an average of ten lamps selected for them by the Swan representatives, against 196.4 candles per electrical horse power from ten Edison lamps, which the Sub-Commission themselves took at random from a stock of several lumidred Edison lamps. This same committee, however, found, that by running the 16-candle power lamps up to 32 candles, they could obtain 307.25 candles for the Edison lamp, and 262.49 candles for the Swan lamp per electrical horse power. As this 262,49 approaches the result reached by Prof. Cross it would seem to prove that low candle power lamps must have been used, and driven up to 16 candles, at the expense of their life, but with much better results as to the power required, for the Sub-Commission found that it required but an increase of 28 per cent, of energy for the Edison lamp, and of 37 per cent, for the Swan lamp, to double their randle power. But admitting, for a moment, that Swan can obtain 20 lamps per electrical horse power, on account of the low efficiency of his battery and dynamo, he would obtain, in actual practice, but 6.9 lamps (34.5 per cent, of 20) per horse power, A recent expert test at the Boston "Herald" showed 8.4 Edison lamps per mechanical horse power, and a test at the Foreign Exhibition 8,88 lamps per horse power, including all friction of engine and countershafting.

There is one important statement made by Prof. Cross, which

should not be overlooked. He tells us that during the time of charging the hattery an arc lamp was kept in the circuit. This was a necessity, and well illustrates one of the most radical defects of the system. By the internal arrangement of the Brush dynamo, a nearly constant external resistance must be used, as by decreasing the external resistance, the dynamo absorbs a larger portion of the current, and that to a dangerous degree. In that system, when running on are lamps, the amount of power necessary is very nearly the same, at all times, as when a lamp is shut off, an equivalent and idle resistance is inserted in the lamp circuit, thus wasting power. This same necessity exists when hatteries replace the lamps, for, as Prof. Cross tells us, "for charging the batteries a self-regulating device is provided by which the current given by the machines" (and consequently the work performed) " is constant, whether the battery is in or out of the circuit," and no attempt unst be made to charge up less batteries than the stated capacity of the dynamos. Thus the 2light Brush dynamo must discharge its current into at least two 20-light batteries, unless the equivalent resistance is substituted for one of them, as ilid Prof. Cross, who used one lamp and one battery. In the Edison system, shutting off lamps, saves power in exact proportion (not considering the friction), for as the external resistance is increased or decreased, the internal resistance is correspondingly varied by means of an automatic regulator

The seriousness of the above defect will be better appreciated when we remember that the demands upon one lattery in a given plant will vary from the demands upon another battery in the same plant, and one battery will therefore be dis-barged before its neighbors, but it cannot be recharged until a proper number are "empticity," so to speak, unless the idle revisaries is used to

replace such batteries as are needed to make up the comple-

Leaving now the consideration of the report, let us consider some matters not mentioned therein, but which are pertinent in this connection.

In the Edison system, where one or more dynamos are used in the same plant, it is customary to so connect them that they shall deliver their currents into one and the same conductor, or, as electricians term it, the dynamos are connected in "multiple are." By no other system of electric lighting is this possible, or at least this result has never been achieved by other than the Edison system. All the lamps are fed from the same source, and each dynamo will light any one lamp in the building, or any number of lamps up to its capacity, distributed at will over the building. In case of accident, therefore, those lights least needed can be shut off, and the power be supplied to those lamps which are essential. With the storage battery this very desirable, in fact, necessary arrangement, is impracticable. Where two generators (and the storage battery may in this connection be considered as such) are connected in multiple are, it is necessary that the electromotive force (or electrical pressure) of one generator should not vary more than 10 per cent. from that of its mates, or in this case by more than 4 units. As the electromotive force of the battery is equal to the sum of the electromotive forces of its separate cells, each cell can vary but 1-5 of a unit from its neighbora result well nigh impossible in practice. These batteries must therefore deliver their currents into separate conductors; when one battery is discharged, its lamps must be disconnected and connected to another battery, thus discharging this second battery in a correspondingly shorter time, and so on; an arrangement which no practical man will tolerate in his establishment.

It may be claimed that in the event of a breakage or disarrangement of the motive power, the batteries would "tide ever" the interval. But it requires ten hours to charge the hattery which discharges in four hours; the charces are, therefore, more than two to one that this arcident will happen during the period of charging.

Since the positive plate of the Brosh lantery is artificially formed from powdered lead solutified by hydraulic pressure, it depends for its consistency upon superficial, rather than noisceniar cohesion. Such being the case, capillary action must specifyl work its dissolution, by drawing the lipid in between the granules. Indeed Mr. Brish depends upon such capillary artion to tender effective the increased surface which he obtains by his special method of formation, and the oxidation and deoxidation of the nositive plate must cause distingation of that plate.

The first rost of the storage battery plant must necessarily be greater than the Edison plant, even including an engine to drive the Edison dynamos; fin, in addition to the latteries, there must be one or more dynamos to charge them. Moreover, on aerount of the low resistance and large amount of current, the Swan lamp requires 1 and 1-2 times as much wire as the Edison lamp.

Again, the running expenses must be larger in the storage system than in the Edison, for there will be ten hours' attention in the former case, against four hours in the latter.

The oil and waste and depreciation, will also be correspondingly increased.

Summing up the results obtained by the foregoing analysis, we find:

FIRST, That the Edison lamp is more economical than the Swan lamp. Sicoso. That by the storage system not more than 34 kper cent, of the power applied at the engine appears at the lamp, while in the Edison system, 90 per cent, of the power applied appears in actual work.

THEO. That since the demands upon one battery are much greater than those upon another battery in the same plant, the caude power of the lamps must vary in different rooms, and different parts of the same room.

FOREID. That every indication goes to show that lamps of low caudie power (say 8 or to caudies) were submitted to Prof. Cross, and driven up to 16-caudie power.

FITTH. That, or account of running the hatteries separately, it is necessary to have a very complicated system of wiring.

SIX10. That on account of the defective internal arrangement of the Brush dynamos, only a fixed number of batteries can be charged at one time without waste of power.

SECTION. That the very action, upon which Mr. Brush depends to render effective the large surface of his positive plate, will speedily work the dissolution of that plate.

EIGHTH. That not only is the first cost of the storage system greater than that of the Edison, but the running expenses of the former are very much in excess of the running expenses of the latter.

MR. BORDEN'S PAPER.

The Brush storage battery, that marrellors innovation so long breathed, has finally been shown to the public at the Williamanic Linen Co., Williamanic, Cono., and a report of the efficiency of the apparatus made to a symbicate of intending investors, by Prof. Cox.s. R. Cross, of the Massochusetts businites of Technology.* From the statements under at the Williamanic exhibition, and from the findings of Prof. Cross' report, a copy of which fell into the hands of the writer, one is enabled to examine somewhat inteligently the outcome of deferred lope, and great expectations.

Briefly stated, Prof. Cross' report may be summed up as follows: There was delivered to him at the Institute of Technology a battery of twenty-one elements or cells, contained in several

battery of twenty-one elements or cells, contained in several boxes, so that he might vary its combinations, to develop current of different degrees of electromotive force.

This hattery, arranged in series, he charged with the current of a s-light machine (Brush), keeping one are light in circuit during changing, the place of the serood are light being occupied by the storage battery, which be found fully charged in twelve and one affined hours. For Cross tells the intending investors that he did not think it necessary to ascertain the power consumed by the engine that drove his dynamo, he supposed it correctly stated in the business circuits of the Brush Company, and assumed it to be one and three-quarters horse-power, or perhaps more correctly, a forse-power,

[&]quot;The full test of Prof. Come seport will be bound on page)

Nor did be think accuracy required that he measure the current developed by the dynamo, which he assumes to be, as stated by the same authority, 9.1 amperes.

Neither does he state the electromotive force of the current, nor the resistance of the lattery, which items ascertained, he of course had data for computing the quantity; yet with these unknown, or at any rate unexplained factors, he gravely states his finding for the efficiency of the lattery to be 87 per cent.

To find the efficiency of the hattery he discharged it through 25 88ma lample, having a resistance of \$8 ohms each. Three sets of lamps were fornished him, and he reports finding the greatest common in the set having the highest resistance, which was the set mentioned above, resistance \$8 ohms. In this conclusion he set mentioned above, resistance \$8 ohms. In this conclusion he bouldness was correct, that being the report of the jury at the Parts Electron Exhibition of \$681, who found the meater-committed may be the Elisacy, whose resistance was \$15 ohms. Prof. Cross-finds he can get 26 88ma humps of the randle-power per electrical bioses-power, a coch takes "about"; amprete of current. This bondly corresponds with the experience of the Paris investigators, but of that more hereafter.

He says an arrangement of the 21 cells, in series, gave him a discharge current having about 28 volts electronative force. Whether this was of constant tension, or variable, 38 volts being the discharge of the hartery, the lamps for the first three hours, in four separate tests, averaged respectively in candle-power 834, 172,8 the adrophing suddenly to an average of 12 centle-power, 183, and 167 fair blooms averaged 164, 640, 462, 173, 8 the adrophing suddenly to an average of 12 centle-power, it is not probable that the Briss blottery differ general from the other accumulators, and its electromotive force varies at different stances of discharge. It would be interesting to know if in the first hour or two the lamps were at an incumbenceue of as and as randle-power, but on this subject no information is vonethseful. This question nightly not information is vonethseful. This question nightly not also the statement of efficiency of the selentific gentleman making the statement of efficiency of the Swan light; and statements of his methods of determination might open a waste field of endighterment to other investigators, who have generally found tension as possible. If Prof. Cross has found a way to test effect in the latest of the profession of

The above statement contains the most important points in Prof. Cross' reprint though it would interest every one to see the whole report made public, as the writer would make it, lead be the report at command. Since, however, the report was not in his hands above one hour, the principal diens of information contained therein are here presented from notes. As wantomedalowe, the latticity of 11 elements familished current for 28 Swan champs of varying candle-power, called 1 sby Prof. Cross, during four and one-half hours, twelve and one-half hours being consumed in charges.

One other item of information may interest the reader, vir., to insure the accuracy of his photometric readings, Prof. Cross says he changed his lamp in his photometer four times during the test.

To arrive at a commercial value of the Brosh battery, supplement the Brish Core property the statements under at Williamate by the Brish Core perpendiatives, and the investigator may then proceed to examine the question with sufficient data to reach results approximating accoracy, as nearly as the approximate nature of some of the information will admit.

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The battery for supplying the current to 40 Swan Jamps of 16 candle-power, during four and a half hours, weighs one ton.

The price of the battery to run 40 Swan lamps of 16 candlepower for four and a half hours is \$400, and that of the regulator for the current is \$115; total, \$515.

The Brush Co. guarantee that the battery is practically indestructible, and its deterioration shall not be more than five per cent, per annum.

The question first arising in an examination of the subject must naturally be: Has any mistake been made in reporting the percentage of current absorbed by the battery which is redelivered in the lamps? This is a question difficult to answer, for we are not told whether the battery had the same resistance as the are lamp it replaced. That an approximate understanding may be had, let it be assumed that the battery had the same resistance, viz., 33 ohms, and that the statement of the Brush Co. is absolutely correct, the dynamo noured into it during the ten and a half hours a current of our amneres. Are the means at hand to ascertain what portion of this charge was redelivered? Such seems to be the case. It is stated that the automatic current regulator of the Brush Co. cuts off the current when the hattery is charged. The circuit, then, during the discharge, consists only of the battery, the conductors and the lamps. Prof. Cross makes no account of the conductors in his calculations. Let them be neglected here, and the circuit complete consists of the battery and 20 lamps.

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The following diagram will make this plann;



Since the external circuit consisted of 20 Swan lamps, having each a resistance of 38 ohms, the resistance of the external circuit was H = 1.9 ohms.

The resistance of the internal circuit, as already seen, was 3.5

The total resistance of the entire α in in was $3,3 \le 1,5 \le 3$, Johns, During the discharge of the battery, therefore, the current used in the external circuit, which is all that is available for producing light, was [1] of the entire current, or [33] per cent, the rest was wasted in overcoming the resistance of the batter itself.

This is rather below the returns obtained by Tresca, in his experiments on the Faure battery in Paris. He there obtained an efficiency of as ner cent.

Certainly, if the hattery was properly supplemented in the place of the arc light it replaced, its efficiency was not 87 per cent., as Prof. Cross reported. But that gentleman may reply the resistance of the hattery was less than 3,5 ohms.

Very well! If he likes that horn of the dilemma, he is welcome to it. If the hattery had less than 4,5 ohms resistance, the resistance of the circuit through which the current flowed from the dynamo was reduced, and the dynamo produced more than 9,1 amperes of current. If the resistance of the lattery was such as to make its efficiency 87 per cent, in discharging, it must have been as low as 3.5 ohm. In that case, the dynamic current was 17-15 amperes, or about twice what Prof. Cross assumed it to be. What a pity he did not measure the current from the machine?

It will be noticed, that if the hattery had been discharged through ten lamps, assuming its resistance to have been 15 of buss as first stated, its efficiency would have been about 50 per cent, unstead of 55 per cent. If the calculation is made at a still bover number of lamps, we shall find that the test lamps the lattery maintains in tennalsecure the latter its results. This would not be very encouraging to the man who wants to use a large number for infastiral purposes of law being the lattery and the first production.

the other assumption is possible; let us see where that leads. It may be that the element of counter-electromotive force in the hatery, entered, together with its resistance, thus making its substitution for the are light possible, and both branches of the preceding supposition fail to meet the case.

Can anything be learned of the efficiency of the system reaching the result from another side of the question? This seems possible, though again arises a regret that the engine was not undeacted.

Prof. Cross assumed its work to be a horse-power. He thinks the battery was changed as minused before he stupped the engine, or in 12 hours 41 minutes. Throw off the 14 minutes, and call it 12 hours. Then 24 horse-power-hours were delivered to the dynamo. One-half this energy went to maintainance of the are light, then the other half, 12 horse-power-hours, or 9290 waithours, were used for changing the lattery. But by his own showing only 9313 watt-hours of energy were delivered to the hamps in dischanging the lattery. engine and the lamps 6357 watt-hours of energy were lost—a lost of 68 for cent. This is rather below that reached by supposing that the resistance of the battery only was the force opposed to the work done in its charging.

Where was the loss made?

Prof. Cross figures under that he battery received hat 4800 watch-hours of energy. If this be the true statement, the efficiency of the British dynamo is shown to be furtalout 50 per creat.

To be sare, this eprecentation, together with the readelivery of rapass watchoms energy by the battery, shows the efficiency of the latter to do for per creat. But the question arises whether the Breish Company will think Prof. Cross for making such a demonstration, when this result for the lattery incloses the showing that their dynamo loses in conversion one-half of the energy amplied to it.

Though the report of Prof. Cross was not written for publication in "Puck," but as a guide to a syndicate of capitalists, the temptation is irresistable to show how anusing it is, just once more.

Without using a single scientific expression, consider:

An engine delivers 2 horse-power of energy to a dynamo for a period of 12 hours, or a total of 24 howe-power-hours of energy. One-half of this goes to maintain an are lamp during the time, the other half, or 12 horse-power-hours of energy to charge a storage hattery.

The scientific gentleman making the experiment tells us he finds he can run zo Swan lamps per horse-power of energy, and the lasttery maintains zo Swan lamps at incandescence for 4½ hours in its discharge. It therefore delivers 4½ horse-powerhours of energy

Hat it received 12 horse-power-hours of energy. What has become of the other 722 horse-powers! Perhaps they are like the

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foulsh virgins of Seripture, that "took no oil with them in their lamps" Perhaps Prof. Cross is going to tell what has become of this missing energy, in the new report rumor says he is soun to ever the world.

Turn next to the results obtained as to the efficiency of the Swan lamps. Prof. Cross agrees with the Paris Commission, that the higher the resistance of the lamps tested by him, the greater the efficiency obtained. From this point, however, there is a divergence of statement. The investigators at Paris found the Swan lamus formished, them by Mr. Edmunds, and having a resistance of 32.78 ohms, to have an efficiency of 10.71 lamps of 16 vandle power to the electrical horse-power. Prof. Cross finds lamps of 18 olius have an efficiency of 20 to the electrical hurse-power How can it be accounted for? Is the explanation to be found in another part of the Paris report? There it was demonstrated that be driving the lange, whose normal cambridge was 16, to an incandescence of 32 randles, this doubling of candle-power was obtained by an increase of but 37 per cent, in current. In view of this fact, can it be possible that by some mistake 8 candlepower lamps were given Prof. Cross, and driven by him at double their normal invandescence? This would account for their apparent efficiency. Would any other theory meet the case?

If this were the true condition of affairs, shat would the effect be of this abnormal increase of candle-power? Evidently the life of the lamps would be much shortened. But how much less would the life he? Thousands of experiments made by the folioson Co. have shown that he life of a lamp is in the inverse ratio of the Jourth power tainy is 1,000 hours, when this incandescence ratio of the reased to to candle power, the life of the lamp will be lint 128 hours. This would be an unfortunate economy of life, to accompany economy of current, seek as Prof. Cross reports. Since such reduction of the life of the lamps, ilways accompanies abnormally high incandsecence, what must be said, even simposing there may be some uther explanation for the 20 lamps to the horse-power, than the only apparent one, suggested above, of the condition of drainer reported by Prof. Cross, namely, a variation between the limits of 191 crandle-power, as a maximum, and 12. C. P. as a minimum during a single discharge? Evidently some correcting feature must be inserted, or the life of the lamps would suffer. Moreover, such variation in candle-power would be entirely inadmissible in a factory of any kind, seriously interfering with the work.

How can such correction be brought about? The only way would be by cutting out one or two cells of the lattery, or relacing its electrometric force. Were his done, it is apparent, those left in the circum would be some discharged than the cells cut out, and when the latter serve needed again there would be found certain cells of the battery having much less electromotive force than the others.

That this is a serious matter, it would be instructive to read the remarks of Prof. George F. Barker before the American Association for the Advancement of Science, at the Montreal meeting, August, 1882.

These may be found in the "Proceedings" of that meeting, just issued, Vol. XXXI., Part 1, page 215. They are as follows:

"Another defect of considerable magnitude is developed when a numler of secondary cells, is placed in series, and who to warm of uniformity in their capacity for storage. This store, both, from the filliculty of constructing them exactly alike originally; and second, from the Impossibility of uniform action among them, on charge and de-Sarge. The difference in the cells of the same lastrey, even when they all have been treated exsertly alike, is varieting."

actly alike, it suspensing."
[Page 18b] "But this is not the worst aspect of the matter. If the discharge be continued for a longer time, some of the cells become exhausted sooner than others, and are then charged in the inverse direction has the current time the test.

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The state of the s

"Tradey will of primary histories in 151, that we had not alwards being solution from the end at the same time will strong and firsh own in the different ordy, and this remark is even more applicable to according to the control of the primary of the same time o

It is evident from the above, that there is a practical obstacle preventing regulation of candle-power during discharge, by varying the number of cells in circuit.

This quotation from entinent scientific authority also reveals the impracticability of connecting latterns together in multiple are, since their electromstrips force must be variable. This impossibility was recognized at Williamattic, where seven latteries were used, having a reprent circuit for each 40 lamps of the 280 their installed.

This arrangement would be utterly out of the question in large and activated in the constraint of the question of the question in the constraint of the cons

These accidents are extremely likely to occur. In fact, so liable are accumulators to unfortunate contretemps, that they have, up to the present time, never been used except in an experimental manner and on a small scale, though known to science since the beginning of the century.

Among the accidents to which storage batteries are liable may be mentioned the following, which may destroy their efficiency entirely, or impair it temporarily:

- 'a Metallic lead, the product of electrolytic action, creeps across between the electrodes, producing short circuits in the battery.
- 6 The sulphuric acid gradually combines with the oxide of lead, and covers the active material of the hattery, so increasing its resistance.
- (c) Local action inside the battery causes the stored energy to be rapidly dissipated.
- d) The exhaustion of the sulphuric acid causes a continuous change in the specific gravity of the electrolyte, which change varies the electrometric force of the battery, and the final absorption of acid by the cells causes them to cease their action.

What now of the guarantee that the Brosh lattery will deteriorate not more than 3 per reed, per annual? Since one has never yet lasted a year, and accidents of what nature has not been repurted have happened to the lattery at Willmannie, and to that in the McKee Rankin Theatra, before they were may amonth, the only means of judging this matter is by ascertaining the experience of those who have had the most experience with other forms of storage hatteries. This seems fair, unless the Brush latteries have fundamental and elementary differences of charater, to distinguish them from others.

From the information given at the Williamatic exhibition, such radical differences of principle do not exist. These batteries were acknowledged to resemble all others for like purposes, in

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having lead plates for electrodes, with finely divided lead attached thereto for accumulating the charge, which charge is brought about by the electrolysis of a weak solution of subshurie acid.

The Brish accumulator, therefore, is subject to the laws goventing the action of secondary batteries, only such modifications of those laws being applicable to them as are brought about by the peculiar mechanical methods used in their roustruction Bordly, the anode and catalode are the same, and the chemical transformation produced by the current is the same as in all secondary batteries.

What, then, has been the experience of other investigators, operating with the same chemical elements, under exactly corresponding criminstances! Since these were well summed up by the intelligent New York correspondent of the Boston 'Dormal,' an a letter to that purper, published in the jesse of April 10, 1887, a question from that correspondence cannot be improved upon soft correspondence.

"Almost simultaneously with the report, which I mentioned a day or two ago, that the Bush Electric Light Company were getting ready to put in their storage leatteries and illuminate New York with Swan incandescent lamps, come equally well authenticated reports to the effect that the value of the storage lattery has been greatly exaggerated, and that it is yet mothing more than a laboratory toy of no practical value whatever. I met, yesterday, a lawyer and patent expert who was sent to Entope this winter on behalf of a number of gentlemen who thought of investing in the stock of the New York company which holds the Faure patents, supposed to be the only salid ones upon storage hatteries. Brush to the contrary notwithstanding. This gentleman went to London to find out what has been done over there with it in a practical way, and has just returned. He saw Siemens, the foremost English authority upon the subject; Luckyer, who is among the best English electricisms; Preces, who is at the head of British telegraph lines, and besides these scientific men of acknowledged position, he advertised for information regarding storage batteries, and questioned all practical men who had had anything to do with the matter. The result was to convince him that it would be unwise to risk money in the storage buttery Jusiness. At his request Lockyer went to Scotland to find out what Sir

William Thomson's experience had been, for Sir William was among the first to give reputation to the storage batters. The story which the great investigator tells is not encouraging to investors in new scientific schemes. He has given more than a year to the study of the storage battery, and confesses that in its present condition it is uscless as an economical apparatus. The trouble is that the hatteries cannot be recharged more than four or for times. the lead plates disintegrate and fall to pieces after that and have to be renewed. The first result of experiments with storage hatteries is to full the experimenters with enthusiasm, then they find that there is a radical fault in the machine, but so fascinating is the after that they say little about the snag they have struck, and work away looping to find the reinroly. For instatice, out of the hundreds of batteries which Sir William Thomson has instructed within the last year and a half, three seem to stand, any amount of techateing and dischateing, the lead plates in these three remain intact while all others have gone to pieces long ago. Siemens talks in about the same vein and acknowledges that the scientific would jumped at conclusions too hurriedly. Preece and Laskver agree with these opinions, and the New York expert came back, and presented a report which has stopped all negonations for the stock in the New York Laure Company

Three views received combonation (today). I mee Prof. Raker, of the University of Pennesdyamic one of the best electricates in the country—and caked blur if the storage leather ways the gent discovers which Branch and the Lame people had announced. Prof. Baker storaged his shoulders, and hambed.

"Therefore, be said, "the genu et a good destroit with, but so make effecting the Epiderray gene or and no much effecting has take per thorities behaving an imposition to sharl year on a get and of its make the perfect of the experiment of the ex

Stephen D. Frield, a practical electrician of excellent require, who fixdense some goad work for the Western Union Company, and a ruppines of Cyrus and Dudley Filedd, Is rather more outspeken than Pord. Busker. The shide thing, it has all to me to take, it is an attempt to make more money. The Ilrush lighting companies throughout the country are not making any profets. The parent company says to them "Here's the stonge latter; Having thus hooked somewhat in detail into the scientific facts bearing upon the Brush storage battery, in the light of the less attainable information concerning it, it may be profitable to those this paper by a brieff examination of the comparative commy of this method of libinumiation, when placed in conjection with a system of incandescent lamps run by a current form deviations, and for incandescent lamps run by a current.

For this purpose, let us take surfa a plant as that installed at the Willmantic Linea Company, where the entire number of its candle lamps is 250. The hatteries to run this plant two hours are serven, weighing seven tone, and cosing \$5,555. Hessise thes, there is required a Brush is shight are machine, which has to run to hours to charge the lattery. This dynamo costs \$2,000 since the aviring and hamps would cost approximately the same whether run on direct circuit or with lattery interposed, this term may be unitted from the present calculation. The cost, then, of the lattery installation, would be, in round numbers, \$8,500.

The claim of power demanded to drive the Brush machine is too lone, stated at 15 lores-power, as in the Brush Co. circular. It is much nearer 25. Nevertheless, that there may be no occasion for any one to complain, cancele the power absorbed to be force-power. This, for to hours a day, would be 150 horse-power, to praduce which would call for a consumption of 600 lbs, of coal, per them, which, for 300 slays, would require yo short tons, and this, at 84 a now, would rect 83 foo.

The lowest amount of depreciation on the battery which can be admitted, until the error of this statement is demonstrated by months of use, is 25 per cent; and this is less than one-third of any result yet shown by other batteries for accumulation of electrical energy,

The expense, then, of lighting by the battery system may be stated as follows:

Cual	
Depreciation and interest on dynamo at 10 per cent	
Depreciation on batteries at 25 per cent	875
Interest on batteries at 6 per cent	210
Total running expenses	1 615

To to this lighting by direct work, would require an Edison goo-light dynamo, worth §3.45c. This would demand 35 Insecpower for one hour, jo horse-hower for two hours, a consumption of 28c Hs of coal a day, and in 48c days 42 short tons would be used, worth 38c 3.56c.

with the battery system, is as \$513 is to \$1,645, or less than one-third.

The investment to light with batteries.......\$5.500

If the hours of lighting are increased to four hours, or any more than already discussed, the investment to light by the direct system does not increase, but only the coal consumed. By the storage system, however, not only the coal increases, but also the investment in dynamos and listeries. If light is required for a hours the comparison would stand as follows:

Note that when the lighting is extended to four hours the investment for dynamos to charge the latteries is greater than that for dynamos to light the nild direct. Hence the capacity of the charging dynamo would more than light the mill direct without the latteries, and the latteries are seen to be an en-

Total \$1,290

Even supposing, therefore, that Mr. Brush has obtained a theoretically perfect battery, the figures are enormously against him, though it were conceiled there were no loss, other than the 13 per cent, admitted by the company, or the 65 per cent, that is urobable.

The fact of the matter appears to be that the shorter the period of lighting required of storage batteries the greater their economy; and this reaches a maximum when they are not used with

Quod erat demonstrandum.

MR. BLISS' REPORT.

By the courtesy of Mr. Scott, Superintendent of the Thread Works, and of Mr. Whittier, of the Brush-Swan Company, in charge of their plant, I was permitted, as representing the Edison Company at Cheago, to examine yesterday,* the installation at the Willmantic Thread Works.

The plant consists of one Brook of San-light (2,200 c. p.) dynami, six lattices (instead of eight, as reported), and say 333 Swan Lamps. Two of the batteries, with say 55 Lamps, are in the office limiting, and the other four, with say 236 Lamps, light one floor of one mill, the batteries being located in the middle of the from. A separate lamp circuit is run from each batter to the lams, untilide-areal file the Bellion Sestem.

Mr. Scott told me that the plant was not the property of his company, and that it was still taken care of and run by the Brush-Swan representative, as an exhibition plant. He declined to speak about the economy and reliability, spring that no indicator earls had been taken, and no dynamometer tests made to determine the power steel by the charging Brush dynamo, nor had the candle-power of the lamps been measured by photometers; but added that whenever the plant was turned over to this company right tests would be unide.

The exhibit not only requires the most constant care, Mr. Whitter having told me that he had not been able to get away for several weeks, not even of a Sunday, to see his family who were only an hour or two away; but something is ever apt to

· camber cyth, c4 :

give our or break down. Last night when I was present, for instance, something having happened to prevent the lighting of one-quarter of the lamps in the mill; and half the lamps in the herick limiting also were, for some reason, not hurning. Just what had happened I could not ascertain. Mr. Whiteir thought it was a defective armatore, Mr. Scott thought it was the poor construction of the dyname, while I was satisfied it was the fourly dyname had been running all that day, from 6, 50, A. Mo 12 M. and 1 to 5,3 F. M., all those ten hours doing nothing but poor its current into the latteries, yet all those hours were not time cough to charge the six hatteries, and hence only five were used, and but a portion of the lamps lighted, a break down that had been going m, was rold, for several days.

This mercifability of the Brosh batteries was an old story to me. This was the third exhibition I had seen, and all were defective. When I inspected the battery at the Brush collect. Chicago, smething was wrong, and the attendant said "a hot of tacks had rattled into the battery;" at the Chicago Exposition, they said "secretal omics of solder had dropped into the battery when making connections," and more comes the third battery, said to be "connected to a defective armature." However, I hardly think that this was the defect, for at 3.5 P. M. the dynamo with the same armature, who turned on to the Brush are lamps in the mill, and I was fold it carried the resoluting band without trouble, So I have an doubt, as I have said, that the trouble was in the batteries themselves, although I do not fail to appreciate the long like of ingentions excuses required by the Brash-Swan system.

The economy of the plant, the vital question after all, I paid especial attention to. Mr. Scott never having made any tests or

measurements, and the plant being still under the manipulation of an exceedingly faithful and skilled representative of the Brish-Swan Company, of course my investigation was less thurrough than I had hoped, but still I learned enough, to enable me to form a decided oninion.

The four latteries used to light one floor of the mill, parlared in the centre of the toun. No oboult this was done, as any one familiar with incandescent lighting will see, to diminish the apacity of copper in the combitories, and, corresponding from the batteries are disagreeable and unhealthy. Mr. South space of this particularly, and said the latteries was disagreeable and unhealthy. Mr. South particularly, and said the latteries would predaily not be allowed to remain in their present position except temporarily, owing to the sickening odder from the artisk.

Besides these fumes, there is a very disagreeable noise. While the dynamo is run to charge the batteries, it can be more plainly heard in the distant room where the batteries are located, than in the dynamo room itself. This is very objectionable, and under no circumstances, I was informed, would the batteries be allowed to remain permanently as now located. It is not the actual noise of the dynamo which is heard at the batteries, but, the current from the Brash dynamo being slightly intermittent, probably every pulsation in evolving gas gives a concussion which represents the homming sound of the dynamo. The evolution of gas is evidence of the waste of current in the battery. and between unhealthy gases and disagreeable noises, Brush Storage Batteries are not desirable for general introduction into private residences and other huddings. On opening the door to a room where the batteries were located in the brick building, the door having been closed and the batteries not having been used for some hours, I found the acid odors sickening.

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The day I was at Williamatic, the dynamo need for charging the storage hatteries, being run by waterpower, was operated continuously throughout the slay while the mill was running, up to the hanr when light was required, at which time the dynamo was switched off from the hatteries and applied to the art lights. The mill started at 6,26 A. M. and ran till moon, then started again at our P. M., and the dynamo was run all this time, in

connection with the batteries, which were not then being used, outil 5.15 P. M., when it was switched on to the arc lights, and the storage batteries were simultaneously availed of for the Swan awandescent lamps. Thus the total time used in charging the storage hatteries on the 17th last was 9/4 hours. The Swan lamps at the null burned for only about an hour, beginning at 5 15 P. M., thereby making 162 lann hours, while the 50 lights on the office building. I was informed, burned from cas till 8 15, or 3 hours, making 150 lamp hours. Mr Whittier claimed that the mill lights were burning at 16-candles, and those in the brick building at zo-candles; but as the result of a large experience in incandescent lighting for two years, I differed with him, my estimate being that the mill lights burned at 8-candles and the others at 10. I have no doubt about this, and I think my large experience qualities me to judge correctly. These 162 lump hours at 8-candles, were equivalent to 4,206 candle-hours; while the 150 lamp hours at 10 candles, equalled 1,500 candlehours. Total, 2,796 candle hours.

From information and personal observation, at Willingantis and chember, any opinion is that zo horse power are needed to run the Brash-Oster, dight daysman, the 18 Jamps being at nominally 2,500 e.p. cach. On the 17th inst, one dynamo of this type was min p/f hours to charge the Justices, but even then it had not had time enough to charge all six batteries. Only five were charged that day, and I was told that this had been the experience for several days.

Now, to compare these figures with the economy of the Rifson Light which by the way has been in use at the same mill for marrly two years, at a very low estimate 195 horse-power applied to an Edison dynamo will yield six 16 candle lamps per horse power, which is equivalent to 1.176 lamp-horrs, or 18.726 candle-hours.

It is therefore my opinion that the Brush-Swan Storage Plant at the Williamantic Mill is yielding a return in light of less than 15 per cent, of the mechanical energy applied at the dynamo, and of not more than 15 per cent, of the result to be obtained from the usual Edison plant.

Mr. Scott stated that the Edison plant in their mills had been working perfectly for two years, even running more lights all the time than the nominal capacity of the dynamo.

I was told that the Brush-Swau Company preferred to charge their batteries with a 4,000 candle-power current, and that they intended to change the present dynamo having a 2,000 candle current, to one with a 4,000 candle current. This is an important fact, showing that practical results have fallen far short of the Brush-Swan Co's expectations, who are now evidently discovering the fact that low tension quantity currents are more economical in charging storage batteries than high tension But as the low tension involves a larger outlay for conductors than high tension, one of their principal claims for economy, viz: small conductors, is lost,

Mr. Whittier told me that when one of the storage batteries is fully charged, resistance is introduced in the circuit to take its place. This of course wastes power, and is another blow to the economy of the system.

The Brush switches for automatically enting out the batteries when charged, struck me as being very crudely constructed Carbon points are used, making contacts which load evidently arced, and I understand that these switches have not always acted, on occasions the batteries having discharged themselves without doing work in the lamp circuit.

I have given a great deal of study and thought to the subject of Storage Batteries, believing that if such a thing as a practical, 43

economical storage battery could be devised, it would be a valuable adjunct to invandescent lighting, but my conviction is, from all that I have seen and learned, that although storage batteries are a most interesting toy for amusing experiments, they are extirely nofit, both scientifically and connecreially, for practical use.

MR. EDISON ON STORAGE BATTERIES.

The following interview with Mr. Edison, originally printed in the Boston *Herald*, is taken from the Sixteenth Bulletin. The spoke of storage batteries as follows:

"'Mr. Edison,' said the writer, 'what is your opinion of the mility and value of storage batteries?'

The storage battery is, in my opinion, a catch-penny, a sensation, a mechanism for swindling by stocking companies.

*Do you wish me to repeat in print that expression?"

*Certainly I do, and it is the trutle. The storage battery is one of those peculiar things which appeal to the imagination, and no more perfect thing could be desired by stock swindlers than that very self-same thing. In 1879 I took up that question, and devised a system of placing storage leatteries in houses connected to mains and charging them in the day time, to be discharged in the evening and night to run incandescent lamps. I had the thing patented in 1879 (I forget the date of the patent), but there is nothing in it. I rung all the changes on it. My plates were prepared like Plante's. The method of preparing them for charging is more tedious, but it is better than that of Faure, after preparation. You know the first storage battery was sent from France by Faure to Sir William Thomson, who was at first astounded by it. He was asked to indorse it, consented and took a retainer; but on investigation he became convinced that there was nothing in it, and returned the retainer to the French company. The fact is, the more he investigated the more he found out the fallacy of the whole business

*On account of what Labouchère calls a swindle, this secondary battery has been used by the are companies in England. One company alone, on the strength of air accumulator and an incandescent lamp, copied from more by one George Lane-Fox, floated subsidiary communies, whose aggregate capital was over \$30,000. 000, and immense sums were paid by these companies to the parent company for rights. Within the last few months the hubble has burst, the shares upon which \$25 bave been paid, are offered at \$1, and the swindling companies have been sued for making misrepresentations in their prospectuses as to the value of the accumulator and the right in the incandescent lamp of Mr Fox, a appearing, from the proceedings before Mr. Justice Clutty, that another company had the right to the lamp, and this company had acknowledged that it was a piracy of the Edison lamp, and were paying royalty to the Edison company for the right to use. The action before Justice Chitty was by a stockholder in a subsidiary commany to cause the return of his subscription on the above account. The judgment was in his favor."

But cannot electricity be stored?"

Yes. Scientifically the thing is all right, but connervality as the source an imagine. You can store it and hold it; that it is gradually lost, and will all go in time. Its efficiency, after a certain monther of charges have been stratined, logins to diffinitish, and its reaparity and efficiency both timitish after a certain time in use, necessitating an or cosed number of bother test to maintain a constant outquit, triving to corresion of the sustaining plates of the lattery, the effect of local action and other causes; too many to enumerate, the yearly depreciation of the lattery is not less than jo per cent of its first cost, if used daily.

'The facts are, that there are two or three companies that have been organizing subsidiary are light companies throughout this country for some time past. In this arrangement the parent comnany made money by selling machinery, etc., to the working companies but the latter are not making money and have nearly ceased giving new orders. Now these parent communies, finding the call for machinery slacking, have come in with their secondary batteries. They now make this statement, which is the clevcrest thing I ever heard of; "Here, gentlemen, you have a large investment in machinery, etc., for furnishing light, but are not making any money out of it. Now, we have something by which you can willize your machinery. You can work day and night, and can do more work. You can utilize your present plant in the day fine, and the electricity thus made in the day time for incandescent lighting, and in the night have your plant for are lighting direct." That sounds good and fair, does it not? The Board of Directors discuss the offer and think it a good thing. Then they conclude to go into it.

1 will tell you where the fallary in this arrangement lies. It consists in the fart that the cost of batteries to store this extra cleartricity that could be produced in the day time would be twice as much as that of the station that produced it is so that, if the company has adready \$100,000 invested, and agree to utilize their company has adready \$200,000 invested, and agree to utilize their machinery in the day time by the utilition of storage latteries, they will fault that to carry out their desire it will cost them \$2,800,000 for the latteries. I will guarantee that and one lhoard of Directors in a hundred will see it, and the parent company will not tell them of it mittal after the have nurchoos of

'Well, they have purchased the storage batteries, of course, at a cost of \$200,000. On that investment, at the end of the first year, they have a depreciation of 30 per cent. To save them-

selves they will have to earn interest on their investment. They must also earn enough to meet the extra depreciation on their plant running through the day, and will have to spend double the amount in coal to Jurian the same output from the latteries, for the reason that they interpose between the source of energy and the light, a titing in which there is a loss both in charging and discharging, and a loss in standing, and that loss increases as the battery gets obter, after a certain maximum is rearcher, after a certain maximum is rearcher, after a certain maximum is rearcher,

What is the maximum of a storage battery?

At is about 50 per cent. Von get the maximum of current when you utilize the full capacity of the bottery, the same as in a steam engine, where, if steam is admitted for the full stroke, 50 per cent, of the steam or power is wasted, but you obtain the maximum power from the engine, but this is also the minimum of commity. Hence, to get the proper commy, engine builders only take one-third to one-fourth of the maximum power from their engines, but this adds to the investment, which is compensated for by the saving in commit, which more than pays interect on increased investment.

When they say that to be per cent as obtained from the battery tell you what is scientifically true. They say the get to lights of 16 candles each per horse power of current from a battery towild give you to lights of 16 candles; and it is not true. If you get a horse power of current from a battery wild give you to lights of 16 candles; but to get that you have to not all losses through the attery, through the wires, through the objustion, and all that. They start off with a horse power indicated in the engine. A certain amount of this is taken to more the engine and dynamo, and a certain amount this is taken to more the engine and dynamo, and a certain amount the owner of the dynamo to convert power into ele-tricity, because m unachine is perfect; a certain amount must be too to the levier connecting the stanton with the secondary battery;

another amount is bot in vlarging the lattery, due to its resistance and imperfection as a mechanism; aucder amount is bot during the literies between vlarging and use; another portion will be lost in discharging the lattery through the lamps, and still another amount will be lost in the wire remerting the lattery to another amount will be lost in the wire remerting the lattery to the lamp. So that your laters prove will dwantle down until a few will give you only about three lamps; whereas, if you worked the rest, you would probably get six banes.

"You are hard on the battery folks."

"The reason I am down on these people is because I have a legitimate thing, and there is a loss of public confidence in it through their operations. We have sweer yet asked the public for money. Now, I don't want the people swindled, for I want our compare to make money out of chettic lighting in a legitimate way, by giving value for what is reserved, and, if it sells rights, to first prove to the purchasers their value by results obtained in actnual practic upon a large commercial swile, as is now being done, and the exposure of such things would make it much easier and better form to a obtainer in western on its true merits.

The same swindle which it is designed to perpetrate upon the people of this country has already been varied out in England, and as a result people there have lost all combiner in electric lighting. The same people are here. They have what they call the Swan lang, a palpable infringeners on unine. We have entered suits against them in England, and will see them here. But these people know well that it will take some time toget a said selection, and by that time they will have "permitted the public to invest heavite."

'Then you consider storage batteries wholly impracticable' Is there no hope for their doing good, legitimate work?

None whatever. Except in a very limited number of cases,

storage of gas multi be under analogues to storage of electricity, then of the primipal outlays of a gas company is for pipes. The average illumeter of their mans is fee or six inches. But, under pressure greater than they now force the gas through their mains, an inch pipe sould answer under the storage principe of lawing a small gasometer in every house. The difference sweet to the company by this arrangement would be about §35 for pipes from house to house, §3 to 30 feet apair. But the gasometer sould house to house, §3 to 30 feet apair. But the gasometer would not a stere, Besales, gasometers would not be just the thing in the hands of the public there upid the explosions; some of them might not have the room. The gasometer would require some little incentances to reduce the pressure down to a limit where it could be harret. Now, those lattle mechanisms are un-

The general intelligence of the public, when applied to mechanism, is also uncertain; and this has probably prevented gas engineers from introducing a system of local storage. The electric are company, which is seeking to introduce a system of storage, follows out the above idea exactly. Instead of using large conductors and low pressure electricity, as 1 do, they propose to save on the investment by using small conductors and high pressure electricity; and to make this kind of electricity available, they reduce its pressure by means of a storage battery in the same way as high pressure gas in a small main could be stored in a onsometer and its pressure reduced to make a available. In the first place, the high pressure current is very dangerous to life. The depreciation on storage batteries alone, in a system of general distribution, would not the interest on the extra copper sufficient to dispense with their use; and second, if these small wires parrying high pressure currents were to be placed underground, as all systems must be to be financially permanent in large vities, the

extra (ost of the insulation necessary to prevent the leakage of the currents of so powerful a presure would more than pay for the extra copper used in a system which carry lose pressure currents, and fon our fengine so expensive more suggest an animat of insulation. The cost of our trains is about \$35,00 from house to losse. These units are two feet underground, where the little-lectual portion of the public cannot reach it to improve it, while lectual portion of the public cannot reach it to improve it, while lectual portion of the public cannot reach it to improve it, while be placed in each flower to save about \$300 in copper and interpret power animeration device in which so per cent, of the article to be back, and, public fassing it a again, said, in his quantit way: "Just as soon as a man gets working on the secondary lattery it brings out his latest (apacing for fying."

But suppose power was cheap, such as a water power, would it not pay to store electricity even at a great sacrifice of energy?

. In utilizing water, power, even where the cost of water is, say nearly nothing, there is still the cost of plant for storing to be considered, and interest and depreciation added. Where is the use of this ontlay when, in nearly every case, by connecting the dynamo direct with the turbine you can get the same result far more cheaply? But you will remember that water power is not so cheap after all. It is only occasionally von can ran across a water power that has a surplus in every month in the year beyond the wants of those who utilize it. These storage men will tell you that lamps hurn better fed from batteries than from the source of power direct. This is not so. They are very brilliant when they start, but more hattery must be put on from time to time, or they will soom go down. If you have a battery that will run to lights, and wish to run them until to o'clock P. M., you must have other hatteries to reënforce it, or the lamps will diminish in candle power before the expiration of the time it is rated for. Then, after turning off the lights, the batteries will lose about one-fifth of the charge remaining in them before being recharged,

There is a natural law working against the storage lattery, and that is, that furly divided lead decomposes water. It is stated that when Sir William Thomson half his attention called to like fact the threw up the sponge. All metals are furly When condition they are asbee, and it takes energy to put them lock again into a metallife form, when it is again furly. Mr. Brush may Siy he has a Serret compound. It is no duling more than a Salt of lead. They use lead, and their lattery is nothing more than a Faure lattery, plain and simple. They say they cannot furrish these latterns for six mouths. There are shops in this city that can turn out force of their cils within three weeks. The parent Brush Company is a respectable and re-possible cognization, but the Brush-kernet company.

Mr. Bilson here two key a paper and read some extracts from a article about the Brush-Swar Electric Light Company. Commerting on it, he said, among other things: 1 believe there is a society for the prevention of rendry to animals, and aunder for the prevention of cruelty to abilities. Now, they ought to get up a society to prevent people making fools of themselves. The reveiting of homes for such arrives a time feel runs to the one be was reading I ought to be made an observe at law, for, if it is not know and a form of orbitating among by false pretences, I to not know and a form of orbitating unoney by false pretences, I to not know

Now, we will return to the storage lattery once more, and compare its costs and results with those of the direct system. According to M. Tresca's recent experiments with a Pauer lasttery at the Conservatoire des Arts et Meckes, Parse, under the most favorable conditions, it was found that it gave only go per cent, from the dynamo and 45 per cent, from the engine. This

Depreciation, 25 per cent	\$2,493	75
nterest, 8 per cent	798	00
As the statement is 10 lamps per horse power		
for the storage cells, they develop 25 horse		
power; but as 50 per cent of the energy de-		
veloped by the engine is all that is returned		
by battery, 37-5 horse power was required		
during the 8 hours of charging. A total of		
too horse power is developed by the engine		
at 4 pounds of coal per horse power-a		
total of 1,200 pounds per day, or of 180		
tons a year, counting 300 days, at \$4.50 per		
108	Sio	00
Investment of \$3,000 for dynamo with which		
to charge the cells, and to per cent, annual		
interest and depreciation	300	ac
Total annual expense without cost of dynamo		
and batteries	\$4.401	75

There, you have the annual cost by the battery, for running 250 lights six hours per day for 300 days. You will observe that only interest and depreciation of plant and actual cost of fuel are charged. Let us now compare the same service by the direct

2.5

system, throwing in the cost of the dynamo, and see what result we shall obtain;

man ontan:	
Cost of dynamo	\$1,000
Interest and depreciation to per cent	,100
as in the other case, 4 pounds of coal per horse power, would give a consumption of 840 pounds of coal per day, and for 300 days, 252,000 pounds, or 126 tons per annum.	
at \$4.50 per ton	567
Total annual expense, \$867, and, including cost of dynamo, it would still be but	\$ 3.867

of \$5,44.75 less than the single cost of doing the same service by the battery system. If we count the cost of dynamo and battery of the indiret's system we have \$2.07.75 for plant, as against our \$1,000 by the direct system. Have I made the matter plain to you? These are the people who proclaim in daday irraduals that they can light cotton wills an horr or two aday by putting it as the dynam to run eight hours, store up the electricity produced, and thus save the cost of an expensive plant to run the direct lights. The battery people will probably state that the cost of the hattery given by me is excessive; that they will agree to sell them for much less, and will, probably, actually do so, as was done in Ragland with the Lance-Fox ham, which was sold in quantity to the subsidiary companies for 5 shillings, while they cost 12 shillings to manufacture.

Mr. Edison then went into calculations for smaller plants, but, as his figures would only confirm what he has just given, the writer thinks he need not repeat them."

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THE SWAN LAMP PATENTS.

Mr. Juseph Wilson Seam, of England, after whom the "Swan Lamp" is named, has only three patents in the United States, relating to incandescent electric lamps. The first, No. 23,1443, was applied for June (oth, 28,1444), was applied for June (oth, 1886, and granted Notwherly 181, 1880; the second, No. 3,14445, was applied for June (oth, 1886, and granted November 9th, 1880; the link, No. 26,344, xwa applied for June (oth, 1886, and granted November 9th, 1880; the link, No. 26,344, xwa applied for April 13th, 1882, and granted June 27th, 1882. These are the only rearens on the "Swan Lamp" in the United States.

Hefore stating what these patents over, let us see what they each of our cover. In that regard, Mr. Swarts own admissions are important. In his specification filed when he applied for his first patent Nr. 8124.64, he says: "My invention relates to that kind of electric lamp in which high is produced by the incandescence of a continuous conductor of carbon emclosed in an echansterd anglass bulb, and provides means for increasing the durability of the said kind of home." Just what is meant by this statement prepared by Mr. Swan himself should be carefully moted. What does he mean!

First. Swau does not claim himself to have invented an "electric lamp," but merely to have invented "means for increasing the durability" of one. In other words, he claims only an improvement on an existing lump.

Second. The "kind of lamp" which his invention "relates to," was one which he found in existence when he undertook to improve it; one, he says, "in which light is produced by the in-

candescence of a continuous conductor of carbon enclosed in an exhausted glass bath." That is to say, Mr. Swan found such a lamp in existence, and he tried to improve it.

Third. This description of an electric lamp which Mr. Ssan undertook to improve, is an exact description of the Kilson in-candescent lamp, on which a patent was allowed to Mr. Ralison in the United States, December 19th, 1959, and issued to him (So. 23,896), January 27th. 1880, seceral months before Mr. Ssen even fleed his application for he first patent. This patent thus grated to Ridion was for "an electric haupt for giving light by incandescence," by means of "arthough diaments," exclosed in a "receiver made entirely of glass from which the air is exhausted," which is exactly the lamp referred to and described by Mr. Swan, at a laster date, in his source.

Thus it appears that Mf. Swan houseff dos laims to have incented an incondescent doe for lamp, and that all be claims to cover by his petents this is trueoff his second and that platents as well as his first, are merely minor points of mechanical detail, being merely alleged improvements in the durability of an incandescent lamp already in existence.

The rise row see just what these alleged incentions chaimed by Mr. Swan amount to. His first patent No. 233-443 has four chains, viz; first platinum craps connected to both the glass and the leading-in wires; second, the carlons loop or horselose formed from a straight strip of parchment paper lent itus whaper, third, the carbon made of parchment paper; and, fourth, coming the leading-in wires and craps with glassor ernamed. His second patent [No. 234,435], contains two claims; first, parchmentizing thread prior to its carbonization, and, second, making enlarged ends therein by wrapping material therearound and cementing the wrapped material by parchmentation.

4. ...

His third patent has four claims, all relating to attaching the carbon filament to the wires of the lanto, by producing a local deposit of carbon at the ends of the filament, and over the tubular ends of the wires which receive the filament. The effects of this denosit is also to enlarge the ends of the filament.

Are these alleged inventions, admitting that they are such, of ony value? Let us consider them in order.

In Swan's first natent the first claim is for plathoun caps, uniting the glass and leading in wires. Mr. Edison uses the platinum leading-in wires, but omits the cap. Mr. Swan'claims that the use of the platinum cap is an improvement on Mr. Edison's method, because a better contact may be made between the platinum and the class. The fact is, Edison early tried both ways and the result of his experiments was that the contact was just as good in one case as in the other, and that the omission of the platinum cap, which alone costs nearly as much as Edison's entire lamp, as now manufactured, was an important step towards economy. Besides that, if the small platinum leading in wires will not make a reliable union with the glass, surely Swan's increase of the platinum surface will not remedy the defect. If there he any defect to such union in the one case, it will still exist even to a greater extent in the other.

The second claim in Mr. Swan's first patent is for a straight strip of paper bent into a loop or horseshoe. This was the form first used by Edison, long before the earliest date which Mr. Swan can maintain in this country, and Mr. Edison has continued to use this method of cutting up to the present time, his bandboo blaments being cut in straight strips and bent into loop form before carbonization. The claim in the Swan patent, however, is limited to the cutting of paper, and hence does not cover the methods employed with bamboo.

The third point in Swan's first patent, and the first point of his second natent, is parchmentization prior to carbonization. Edison tested this as early as 1878, and he soon after mentioned it in a caveat, He made a large number of lamps in this way, but considerations of cheapness and uniformity have caused him to adhere in the manufacture of lamps for sale to filaments cut from bamboo and carbonized without the additional step of parchmentization.

The fourth claim in Swan's first patent is conting the leading-in wires and caps with glass or enamel. Mr. Edison also used this device, but being able to make a perfect lamp without the expense of this additional step, it is not employed in the manufacture of the Edison lamos.

The remaining point in the second Swan patent, is making the enlarged ends by wrapping. This is neither so cheap, effective nor simple as the later plan invented by and now used by Mr. Edison, namely, simply striking out or cutting the carbon with its enlarged ends homogeneous with the body. By the latter there are no additional steps, while by the Swan plan there is an additional step, requiring techons and delicate manipulation, adding to the

The third Swan patent on the securing of the curbon filament to the wires by a local deposit of carbon, describes a process which is essentially the same as that covered by a patent granted to Mr. Edison, March 22d, 1881 No. 239,151, over a year before Mr. Swan filed his U. S. application, or more than six months before Mr. Swan filed his application in England. Mr. Swan's patent covers only one of the specific results of Mr. Edison's process, and it is therefore tributary to the Edison patent. Mr. Edison also accomplished the specific result claimed by Mr. Swan, and could undoubtedly prevail in an interference if the matter were thought of sufficient importance to warrant the expense

For this particular portion of his lamp Mr. Edison now uses cheaper and better methods, which are fully covered by patents.

It thus appears that Mr. Swan's so-called improvements on parts of the incandescent lampare, commercially speaking, of little value. Every point claimed by Swan is something which Mr. Edison has used, but which has been superseded by other inventions in the march towards simplification, which means the best result, and the best service for the least money.

Having thus shown what the alleged inventions in the three Swan patents amount to, let us see whether Mr. Swan bas a good title even to what he claims.

Upon the second and third points in his first patent Swan is already in interference in the Patent Office with both Edison and Maxim. On such points. Swan being a foreigner, the earliest date of invention which under the law he will be permitted to prove, is either the date of filing his application in this country, viz: April 12th, 1880, or the date of his earliest foreign publication, namely, his English patent of July 20th, 1880. Both Edison and Maxim, in their preliminary statements, set up dates long anterior to Swan's earliest legal dates in this country, and there can be no doubt that one or the other will prevail against him and receive the valid patent on these points. As to his second patent, applied for June 16th, 1880, which is the carliest tlate of invention our law assigns to him, being a foreign inventor, as against a citizen inventor, Mr. Edison attacks him on the broad grounds of making enlarged ends by wrapping around the end of the carbons. This invention was not only made, but was publicly mentioned by Mr. Edison long before Mr. Swan's earliest date of June 16th, 1880. Indeed, it was even described in one of Mr. Edison's patents 'Edison's Canadian Patent No. 11.520', filed before that date. There can be no doubt, therefore, that Rilson will prevail against Sxxn on this point. The same is abot true of the points covered by the third patter. Thus, of the few things chained by Sxan in his three patents, it is certain he cannot hold two of them, and it is probable, for reasons which should not now be divulged, that dee not not hold any. But even if he could hold them all, Mr. Edison would be entirely unaffected, because Mr. Swan's patents are simply for matters of detail, which Mr. Rilson no longer uses. Sxan covers nothing Edison uses, and what Swan uses Edison has left he hind.

Thus it appears, with regard to the Swan patents—first, that they do not cover an electric haup, and contain no broad or fundamental principles, but are matters of more mechanical details, second, with reference to a part of the alleged inventions emleaced in the patents, Swan is in interference with two other inventors, and there is every reason to believe the will be defeated; and third, that the art of making an meand-sever tham has subvanced so far since Swan's alleged inventions were made as to make them of little or no commercial value at the present day.

Hut it must be remembered that even if Mr. Swan's patents were for a lamp instead of tor a few details of one, and even if those details were important, his patients would still amount to nothing muless he had also invented and patiented a comprehensive system of insign them. In this respect Mr. Swan has nothing. He has no jotents shaltever on any system or on any of the almost innumerathe details needed in a lighting system, involving regulatini, distribution, measurement, conductors, safety-cardiers, meters, chandlest, pinekes, thory lights, etc.; not do the Swan patents confer any right on him to use any such things, or even make a lamp. The slightest need what he alleges to he his inventions involves infringement of underlying jutents granted to another. All these details of the accessary parts of a system of

incambescent lighting have been elaborated and patented by Mr. Edison. It is impossible to make or introduce an incambescent lamp without them.

In this connection, a course statement should be under of Mr. Edition's peterns furthfulling his fundamental patterns was nevertice lamp, his patents on methods of manufacturing a hung and methods of the patents of the important details of a system of incandescent lighting. The fundamental patents, which give Edition a monepoly of the incandescent hung, are as follows, namely, No. 222,588, dated January 27th, 1886; NN 27,2229, dated My th, 1889; and NN 27,229,55, dated July 20th, 1890; and Nr. 27,229, dated July 20th, 1890; and 189

- An electric lamp having a continuous conductor without regard to its material, resistance or mode of preparation and an exhausted glass enclosing globs.
- An electric lamp having a continuous carbon conductor (irrespective of its material, resistance or mode of preparation and an exhausted class enclosing globe.
- 3. A filament of earbon of high resistance secured to metallic
- 4. The method of manufacture, i. e., first, separately forming the enclosing globe and the support for the earlion, and then affixing the earlion upon the latter, uniting the globe and support,

The broad principles covered in the above-named fundamental patents allowed to Mr. Edison are so exclusive that it is not too

much to say that neither Swan nor any one else has made or can make a successful incondescent lamp without infringing every one of the above patents.

But these patents allowed to Mr. Edison on his lamp are only as a small portion of the patents allowed to his in connection with the use of the lamp. Up to the present time no less than 227 patents have been allowed Mr. Edison, in the Untut States alone, on his hamp and on the details connected with its manufacture and use, and he also has 129 additional applications for patents on the same subject now matting examination at the Patent Office. These patents overs and subjects as the lamp, regulators, the patents overs the subjects as the lamp, regulators, motors, combits for, undergound mains jumination hoses, where, shaddings have keep and may other devices, alloughter constituting a complete and perfect system of electric largement.

The whole subject of the Swan parents in the United States may be summed up as follows:

18t. Mr. Edison is an original inventor of a new type or genus of lamp. Mr. Swan does not claim to be such an inventor, and claims only to have made improvements of detail in such a class or genus. Indeed, Swan dischoins the inventorship of the class of cremis.

2d. This new type or genus of lamp is patented broadly to Mr. Edison.

gd, All that Mr, Swan claims are only some mimor features of alleged improvements, but they cannot be considered as having been improvements even at the dates of Mr, Swan's patents, all of them having been used by Mr. Edison and superseded by simpler and more economical means long before Mr. Swan's patents

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5th. As to the points covered by the Swan patents which are not now in actual contest, Mr. Edison retains the right to establish priority of invention, and to obtain patents, if at any time these points should prove of sufficient commercial value to warrant his doing so.

TWENTY SECOND BULLETIN. The Edison Electric Light Company

65 FIFTH AVENUE, NEW YORK.

April 9th, 1984.

(These builettus, engitudly award as a correients way of ausorering the oupsides of distant agents, are now, in response to insureaus reports, and also tall studies builders, to give them information of the peopers of the Company and of other matters of greater or less interest controled with electric lighting. Agents are particularly responsed to communities to the Pearlow wheter pearload in greater all interest may be developed by their experience in installing or opersing our lights).

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FIRST DISTRICT, N. Y. CITY. THE PLANT ENLARGED.

This plant is now in its nineteenth mouth of continuous running. We are at present lighting over 500 houses, wired for nearly 13,000 hamps, of which 11,272 are actually attached to the conductors, available at will. The demand for the light far exceeds the supply, and the station is now being enlarged by installing additional dynamos in the adjoining building, giving an increased capacity of about 3,000 lamps.

TESTIMONIAL. DAVOL MILLS, FALL RIVER. We have received the following testimonial from the Davol Mitts:

"Office of the Davor, Mills, & Fall River, Nov. 20th, 1883.

SPENCER BORDEN, Esq., AGENT,

Boston, Mass DEAR Str :- In regard to our electric light plant of 350 to-camble power lamps, installed by you in time, would say that the Edison system was adopted by as after a thorough and careful examination as to the perits of this and other systems, and our experience has thus far fully confirmed our previous

opinion. The results of tests for amount of power required to run the plant, are very satisfactory. Our "11" dynamo is run directly frum our 30 x 72 engine, and a careful test by indicator made Sept. 6th, with 312 lamps runnine fully up to coulde power of the lamps, gave us as amount of power used

14.2 II. P., an average of 9.12 per II. P. The attendance bestowed upon the running of the plant by us, is about one hour in the morning, and two hours at evening by our master mechanic, and during the remainder of the day it is run by our engineer in charge of the main engine.

I would say that our basement weave room, requires light during the entire day almost without exception, say 60 or 70 lamps.

Our total loss of lamps by carelessness and lenning out has thus far averaged about one lamp per day, which we naturally expect to increase. Our brushes and commutator are in excellent condition, and look as if they might but for years.

We are tally satisfied as to cost, quality and quantity of light. Atment T. Dow, Agent,"

TESTIMONIAL. ECONOMY OF THE EDISON LIGHT. By permission, we publish the following letter winten to Mr. Henry

Crofut, Danbury, Conn. by Messrs, John B. Stetson & Co., Phila-" Prin aparents, Pa., Nov. 254, 1883.

Mr. HENRY CROFFEL Durbury, Contr.,

DEAR SEE ... Your letter of nepury dated Nov. 17th, was duly received on the 19th. The only experience we have of the Edison incondescent light is what we have had morn motory for the post two years. When placing the present plant, consisting of So H. P. engine and 2 K dynamos, we made a test on April 13th, 1883 and found the following: Lamps in chenit 500, for 5 hours; revolutions engine 1731, of dynamos 900; initial pressure of strain 70 lbs.; coal consumed 1,650 lbs.; oil used 1 qt.; water 1.821 galls.; total cost reckoning for breakage of lamps, men's time, and interest on investment was \$8.76; whereas, for 510 gas burners used 5 hours 12 M ft. would be consumed (a, \$1.90 per M - \$22.80; so the electric was \$14.04 cheaper, besides being more satisfactory as an illuminator.

Very truly yours, John B. Strason & Co."

OUR LIGHT ENABLES A FACTORY TO RUN MORE HOURS. The light from the Edison plant installed in the cloth mill of the Broad Brook Co., Conn. is used in the finishing room, where the cloth receives its final inspection, and, if necessary, slight imperfections are repaired with the needle. Finding it impossible to get any arrangement of gas lights which would enable them to turn ont

sandarmy work, the mentilers have always been obliged to stopwork at dark. Since the Eldson light has been introduced in the finishing room, the one just of the factory has been almost doubled, because the light can be need where get or other amificial light would not. The agent told our represents or that the Eldson light would enable him to deliver county ordered goods, which would otherwise have been countermanded, to then the cost of the plant this season.

TESTIMONIAL. WORSTED MILL, MALDEN. The following letter has been received from Mr. John Cochrane, Jr. :

"Mapping Mass, March 28th, 1884.

Trasas Expense Co.,

Boton.

GASTIMAS: Hypers in pleasure for inflamination of the excellent working of relevant lights yet pair up in my worked mill in Maldon. Then have been in operation is to meet flam two meanls and first the pair for dismonstration and in the pair of the control power attention; the highling even is be e-part highly working. At 1 manufact in deep classification and with a control limited by which is a proposed to the proposed proposed to the proposed power and highling is the polar morphism of purposed power and possible with an inflamination of purpose in proceedings of their plant in the purpose proceedings on all the polar polar proposed possible with purpose proceedings of their plant in the purpose plant in the proceeding proceedings of their plant in the plant in the proceedings of their plant in the plant in the plant in the proceedings of their plant in the plant

Yours truly,

JOHN COCHRANG JR."

TESTIMONIAL. COLUMBIAN MILLS, SOUTHBRIDGE, We have received the following letter from the Columbian Mills:

" Seattmantiste, Mass., March 28th, 1884.

EDISON ELECTRIC LIGHT Co., Beston.

GESTS:—Your favor of 27th lost, received, asking about the working of our light. It has worked entirely satisfactory to so from the amount itself entirely satisfactory to so from the amount itself entirely which was about the first of January 1st. having had no tondle. Behave patting in the electric light we need assemble of the conceptually are electric light and have no reason to require other. We have

run them about 700 hours. As to the expense we are mable to say, not yet knowing the life of the lamps or machine, and not of power we are unable to determine exactly be sure we have need both steam and water. The labor taking care of the meshion is of title we san't estimate it.

Neither gas or rol could give so good satisfaction.

Yours truly,

COLLABRAN MILLS."

PLANTS SOLD SINCE MAY 318T, 1889. The 18th Balicam contained a lost of all Edoom is dated plants then in operation in various parts of the world, 334 plants, aggregating 65, 145 lamps. (18) plants, 19, 519 lamps, we in the United States, and the remainder were in other parts of the world.

Since the 18th Bulletin, May 318t, 1883, we have sold the following permanent plants in the United States and Canada, making a total in this country, to date, of 327 plants, aggregating 50, 173 lamits.

PLANTS SOLD SINCE MAY 31ST, 1883.

Name or Divisor	Ansortes.	Le mero Prot	LAMP
Annu 12dred 1 unior A. M. f. t. Annu 12dred 1 unior A. M. f. t. Annu 12dred 3. Security 1. M. M. March 12dred 1. M. M. March 12dred 1. M. M. March 12dred 1. M. M	Rationers, Md	Na Md. Sa Mdl. Paper Fators Iron Works 1 steel Mdl. 1 r Strag Warbors Nal Fatory Store and Office Store Mdl. 1 store Mdl. 1 store Mdl. 1 store Mdl. Paper Store Mdl. 1 store Mdl. Paper Store Mdl.	500 510 500 500 500 500 500 500 500 500
Committee and a committee of the committ	(52.4		

PLANTS SOLD SINCE MAY 318T, 1883 .- Continued.

0.01115			Neuman
NAME OF OWNER	Atomas.	Lot store or Person	Lawra
management of the same of the same of			
Canadian Cotton Co		Cetten Mill	y = 1"
John Cochrane, Jr		Worsest Mille	2254
Central R. R. Co. of N. J	Philadelphia, Pa	I toryless "Farened"	fee.
	* *****	"Cestral"	6.
		"Planfell"	t.
~ * * * *		" "Communique"	60
Columbia College	New York City	For Labrary, etc	P
College of the City of New York		For Work Shop	*5
Canada Sugar Refining Co		Negar Refinery	250
Canadian Pacific R. R. Co		S. S. "Algema"	1100
		" "Alberta"	
	* * **	" "Arthabae a"	100
Conglomerate Mining Co	Lac la Belle, Mich	More	244
Columbian Mills	Southbridge, Mass .	Worsted Mills	100
David Mills	Fall River, Man	Conton Mill	150
Darlington, Rush & Co	Philadelphia, Pa	Dry Goods	400
Faterprise Manfig Co	Augusta, Ga	Conco Mill	550
Expension Cotton Millions	Atlanta, Ga		150
Eclipse Labreating Oil Co	Frankles, Pa	Old Winks	45
Eden Musee American Co. 11 d	Now York toty	Paternameent Hall	7.0
Flor Mills	Fall River, Mass	Cotton Mill	tı.
Fulten lise Works	Desput, Mah	Engine Steps	61
Friends School	Promience, R. L.	Short	25
Franksch Paper Co	Kankama, Wis	Paper Mill	91
Max Flenchmann	Withandorg, N. V.		+5
G. H. Gillert Manfig Co	Wate, Mass	Wasden Mill	***
G. K. Goobbag	Maiden, Mass	Cotton Waste Factory . ?	*5
Garner & Co	Wappungers Falls	Cotton Mill	***
Goldme & McCullock	Galt, Ontareo	Engine Shops	***
Glen Pulp Paper Co	Horse Tunet Mars	Paper Mill	*5
Gorbare Manfig Co	New York Car	Story and Others	255
Glide Descret	St. Leuis, Max	Newspaper Others	***
William J. Hosper & Son	Haltemore, Md	The Herald Offices and Rope Factory	3011
II. J. Hellerch & Co	Uno. N. Y	Shor Factory	Part .
Harrison, Havemyer & Co	Phylodelphia, Parres	Sugar Refinery	1500
"Hughes"	\$61 Boundway, N. Y.	Carry Street,	120
Harry Hell	New York Cay	Threspe	150
Halifas Sugar Refreety	Halifer, N. S	Sugar Refinery	20.00
I. F. Heplans & Co	Stratford, N. V	Pann Sounding Board. 1	50
O. Hammond, It.	Baldmore, Mil	Packing House,	100
C. I. Haver	. Dayton, Ohio	Straw Boatel Mill	800
III. Central R. R. Ch.		Transfer Boat	50
Jen's Marufacturing Co		Machine Shepe	160

PLANTS SOLD SINCE MAY 318T, 1883. - Continued,

Name or Owner	Asgress,	LONATOIN OF PLANTS	No see
Cirally Henthers	Non-York Later	For " Excelse t "	
ape & Bender		Floring Mill	
W. Livery A Course or cons		Saw Mill	
Arrelee & Co		Ctacket Factory	
dandel Bushers	Checago Illa		
denters Mill	Fall Roor, Mars	Letter Mill	
dadrale Serel Werks	Philadelphia, Pa		
L. McArthur & Son	Des. N. Y	Northern Budget and Troy belogram	
Maruter's M'Tg t'n	Danville, Vancouries,		
Meanch Darrad Co	Holyokr, Mass		7***
P. McCartley & Ser	Spraine, S. T.	Day Goods Store	130
Madron Worlen Mill.	Matres, ful	Westen Mill	
Militar Sewing Marliner Co	Chillande, Chan		
Sugene Manuel		Plumg Mill	
Michigan School for the Illand	Lanung, Mich		
Miller Manual Later School		Shed	
Minchell, Vance & Courses	N. Y. Tay		
New Bolfool Cordage Co	Now Belferd, Mars	Repe Partery	
Robent P. Never	Pending Process	Pullsburg Town (Mirra	
Northern Parts, R. R. Co	Parlad Degen	S > " Kalma"	
Natural Manfa to	Nathulle Iran -	tona Mill	
N V. L. F. A. W. R. R. La	Buttala, N. V.	Gern Fleutet	110
Norwich & New York Trans	New London, Loren	per "Cas of Womenter"	317
Nannkrag Mills	Salem, Mass.	Cotton Mill	
New Orleans Relingerator Co	Now Otherms, Lat	Cald Storage	
John T. Nove N'Ce Co		Machine Shope	6.
M. & W. H. Nixon		Paper Mill.	- 60
Newton & Co		For Book Factory	
Nontre & Co		Floor Will	
Gram Strateship Co		4 x "Kinse"	
Ourcen R R & Nav. Co		. "Alaskus"	
			1 200
One Paper Co		Paper Million	
		Office	
Philadelphia Water Works	Philadelphia, Perco	. Delm-or Pamping Station	. 10
Press Company			
Park & Tilded	Own Park Con		
Plankinne Hoer	Mile of the Wit		
Pakachong Mills	Warmer Man		
Petilene Paper Co	Manager Latter N. V.		
Pfeffer & Son	Carlede, Passes	Companie Rooms.	. 81
Queens Cn. Od Works	Cincumatt, Ohio	Printers	10.

11

PLANTS SOLD SINCE MAY 31ST, 1883. Continued.

Recerule Cenon Mills. Rack Manufig Co Sandernas & Co Sante Institute for the Admiration of the Deaf and Bands. Sante Institute Sort Co Sante Institute Steel Co Sante Co. Sante Co Sante Co Sante Co Santerna Car Works	Rorardie, Ct. Mitwankee, Wis. Jacksonville, Illa. Syratius, N. Y. Ralionore, Md Cis invest, Olion. Knowille, Iwan Syratius, N. Y.	Woolen Mill. Flour Mill. School, etc. Sheet Works. Fock Packing Heaves. Carriage Badding Phage. Machine Shepp.	50 60
C. Nanderson & Co. sate Institute for the Lidera's time of the Deaf and Damie. It builds not literated by antherson literates Stort Co. such C. Shaler white A Co. bouthern Car Works	Milwankee, Wis Jacksonville, Illi Syracme, N. V Baltonore, Md Cir. urrent, Olion. Krostville, Jean. Syracme, N. V	Flour Mill. School, etc. Steel Works Pock Packing Heaves Carriage Building Shops Machine Shops.	60 to pt 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
C. Nanderson & Co. sate Institute for the Lidera's time of the Deaf and Damie. It builds not literated by antherson literates Stort Co. such C. Shaler white A Co. bouthern Car Works	Milwankee, Wis Jacksonville, Illi Syracme, N. V Baltonore, Md Cir. urrent, Olion. Krostville, Jean. Syracme, N. V	Flour Mill. School, etc. Steel Works Pock Packing Heaves Carriage Building Shops Machine Shops.	60 to pt 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
tim of the Deaf and Dunte .) and trum line Steel Un. and C State where & Co.	Syratme, N. Y	Steel Works Fork Packing Houses Carriage Building Shope Machine Steeps	***
exhler A Co	Rahomore, Md Circurent, Olios Kronville, Iran Syracore, N Y	Pork Packing Houses Carriage Budding Shops Machine Stopes	3
enther & Co	Rahomore, Md Circurent, Ohio Kronville, Iran Syrarme, N Y	Pork Packing Houses Carriage Budding Shops Machine Stopes	3
enther & Co	Knowelle, Iran Syramus, N. Y	Carriage Budding Shops Machine Stops	- 45
centhern Car Works	Knowlle, Iren	Machine Storge	55
was Manual committee the	Sytamer, N. Y		
to in Brothers			74
Bipper's Upper Columbia Recent	Leanwille, Ind.	Nr. "Besses McMiller"	**
electrof & Mattheway,	Nogara Falls, N. Y.	there Mill.	
Crepany	Concernge, Md	Paper Cathery.	
Vilham Sillers & Co	Milleurse, Passess	Dear Mill.	-
Non. Your Street & Non.	Haver de brace, Md.	For Lighting Calves	
t, Lawrence Sugar Returns I'm	Montreat, Cannon	Sugar Reference	
Beensen & Chester	Buttalo, N. V.	Gent Miller	· ·
Laylor, Waltenden & Co	Cardington, Passess	Worlen Mill	
inkey Red Dieng Con	It Hefmar, R. L	Dyell ages	
Day Frent	Iroy, N Young	Seamort Others	
. S. Diavernment.	Washington, D. C.	S S. " Ireneus"	
· · · · · · · · · · · · · · · · · · ·		Batte Par Hibre	100
" " - The second		Gor Printing Office	
Getort Marke Co	Balamage, Md		
Wretten Nad Co		Nad Factory	
Nothenden, Share & La	Captierton, Pa	Woolen Mill	
Votes wer Cores Co.	Worder, Man.	Cornel Factors	
pulsate Paper Co	Vendant Mak	Pener Mall	

^{*} The sales marked thus * are increases of plants already installed

FIRST PRIZES FOR THE EDISON LIGHT AT THE LOUIS. VILLE EXPOSITION. Four first prizes were awarded the Edison Company by the jury appointed by the Commissioners of the Southern Exposition recently held at Louisville. These prizes were for (1) the best Incandescent Light System; (2) the best Dynamo for Incandescent Lights; (3) the best Electric Lamp for Incandescent Light; and (4) the best Incandescent Light. 'The jury consisted of Mr. Benjamin Rankin, Chairman, Superintendent of the Lonisville Gas Company; H. W. Faton, Ph. D., Professor of Physics and

Chemistry at the Louisville Male High School; Mr. W. W. Weaver, Mechanical Engineer, connected with the Babcock & Wilcox Botler Co., Chicago, Ill.; Mr. Charles Smith, Electrician and Superintendent of the Western Union Telegraph Co., at Louisville; and J. A. Tanner, M. D., Lecturer and Scientist, of Polytechnic Society of Kentucky, Louisville,

The following extract is from the Report of the Jury, dated November oth, 1881:

"The tests of the Edison system are most satisfactory as to the efficiency of the various appliances, the steadiness of the light produced and the general results. It is a matter worthy of notice that during the 100 days of the Exposition with over 4,000 Februar lights landing, there was not at any time a suspension of light from failure of the appliances of the Edison Electric Light-

ing Company. The average life of our lamps for the whole period of the Exposinon was 1,850 hours.

TESTIMONIAL. SYRACUSE, N. Y. We have received the following letter from Messes, D. McCarthy & Co.:

"STRATEST, N. V., Jan. 16th, 1884

Concer Practice Light Co. GENTLEMEN, -- In reply to your request for a statement of our opinion

regarding your system of lighting, which we have had in use in our store alsent four months.

We find it all and even better than you represented. We are perfectly satisfied. Heretofore we tried the arc system but found that it faded some of the fine shades of goods, and was impleasant to the eyes, besides being very muchiable. Our Glisen light is very soft without the disagreeable noise of the are light. We believe all shades of rolors can be easily distinguished by its use. It is also absolutely safe, a great consideration. All our help are well pleased with it. At the book Acepers' desks there are argaint gas burners which are used when the current is not mured on. They all say the Edison light is the best they ever used for writing, and that when they return to gas they can scarcely see. We are obtaining from to per cent, to 25 per cent, more lights from the machine than you sold it for. We are running every night from 175 to 193 lights with a 150 light dynamo. This we consider a wunderful thing, for most machines run short of the guarantee. At first we feared it would harn the armature, but now consider it all right. We have over 200 lights placed, as we expect to increase our capacity by placing another dynamo

We put in new boilers, engine, etc., expressly for this plant. As to expense compared with gas at \$2, per 1000, we find that taking interest on investment, depreciation and all running expenses, it costs less than half our former gas bill for the same time. We are obtaining more than use times as much light, which is in every may preferable. The light is used in elevator, sewing-mone and on table in private office. In all places it has worked to perfection. We heartily recommend it.

D. M.Carney & Co."

\$957-90

TESTIMONIAL. COST OF THE EDISON LIGHT. Messis. Clark & Keen, manufacturers of cloakings and suitings, Philadelphia, have smolled us with the following statement in regard to the cost of operating the Edison light in their establishment;

"Ressus, Time:-16t mights of 12 hours. 1.022 hours. an days of 4 " · 160 " - 2082 NUMBER OF LASTIS RUST Average, Number of lamps renewed, Cost or RUNNING-Foel, wear and tear, &c., \$2 per night Lamps renewed 135.00 Oil and supplies Wages of attendant, 12 weeks (6, \$10 120,00 laterest on plant (4 6°; 124.90

Average cost per day and night \$5.11."

Total. To light by gas for the same period of time, using a six-foot burner, formerly need, in place of each Edjson 16-candle power lamp, would have

Messes. Clark & Keen have also forwarded the following letter

"Office of CLYRK & KEPS, 1,720 North 2d St., 1 PHILADO LPHIA, P.A., Dec. 17th, 1883.

Enson Co. for bottern Course. GENITEMEN :-- We cheerfully certify to the following statement:

1st. That since January 4th, 1883, until date, our 250 lamp dynamo machine has run without repairs or trnewals of brushes.

2d. That the actual running time of same has been 2,767 hours. ad. That is that time not lamus were broken :

And, that we consider our plant as saluable as any other machine we

We remain, yours, &c., CLURK & KERN,"

That means that the average life of our lamps has been 2,590 bomrs.

EDISON DYNAMOS FOR TELEGRAPH CIRCUITS. W. have sold to the Philadelphia Local Telegraph Company two dynamos to supply current for the gold and stock reporting telegraph circuits of that company. We are informed by the company that the dynamos are giving entire satisfaction.

FOUR THEATRE PLANTS ABROAD. La Scala, Milan, is lighted with 2.6 o Edison laurus from the Edison central station in that city. There are four main circuits, one of 946 lamps on the stage, another of 372 lamps in the dressing rooms, stage passages, etc., a third of 470 lamps in the orchestra, passages, corridors, boxes etc., and the fourth, 812 lamps, to light the entrances, foyer and eaff. On grand occasions the number of lamps on service can be increased by about 280 lamps.

The Manzoni Theatre, Milan, is also lighted from the Edison central station

A certificate is published signed by the Burgomaster, Bruun, stating that the Edison installation in the Municipal Theatre in that city, "works to the general satisfaction of all concerned and that it has never given any cause whatever of complaint."

TESTIMONIAL FROM BALTIMORE. We have received the following letter from Messrs, William J. Hooper & Son, who use the Edison light in their twine and net factory, as well as in the offices and composing rooms of the Baltimore Herald:

"BALTIMORE TWINE & NET CO., P. BALTIMORE, Mrc., March 22d, 1884.

THE EDSON COMPANY FOR ISOLATER LIGHTING, New York.

GENTERN'S: - In answer to your inquity to day as to how we like your light and the cost as compared with that of gas we have to say that we have been common the beht about six munths, and she not besitate to say that it costs about the same as though gas were furnished at 60 cents per 1,000. We are very much pleased with it and see no resson to regret the investment me have made

In making the above estimate we have reckoned the entire cost; the cost of power, depreciation of plant and interest on the investment-Yours respectfully,

WILLIAM J. HOORER & SOS."

THE BROCKTON COMPANY, MANAGER'S CIRCULAR. The following circular issued by the manager of the Edison Electric Illuminating Company of Brockton soon after starting and before people had become familiar with the light, is of interest:

"BROCKTON, MASS., November 14th, 1881.

We desire in the interest of economy to our customers, to call attention to several points which the consumers of the incandescent electric light are very naturally apt to overlook, and which bear directly upon the cost of their illumination.

t. The bulbancy of the arc light in cities has established an impression which it is now difficult to correct, that any electric lamp ought necessarily to develope an illumination of high intensity, and that an assurance that the Edison light shall cost no more than gas means that, for the money heretofore expended for a limited amount of gas light, this company proposes to furnish a practically unlimited light by electricity. That this idea is not confined to Brockton will clearly appear by a quotation from an article printed in the New York Flot of October 17, relative to the Edison system which has been in successful operation there since September 4, 1882.

"The chief and practically only complaint, according to Mr. Chimosek, the superintendent of the district, is that people burn the light recklessly, and are then suprised that their bills are higher than gas bills. "The public," said Mr. Chitmsck, "the not seem to believe that our meters are as accurate as gas meters. As a fact they are a good deal more so. People imagine that it does not cost as anything to erec them the light; all that we have to do is to set our engines going, and whether they use more light or less light makes nu difference to us. Some time ago we put electric lights into the office of an insurance company with the understanding that the light would rost no more than gas. The president or agent had twice as many electric lights put in as there had been gas lights, and at the end of the first month his bill, to his great ascenshment, was double that of his former bills. He came to me to complain. I asked but which e had understood by our saying we could give him as much light toe the same money as he had been getting from gas. ... Why, "" said be, ... I thought we were to luse all the hold we wanted." 'I asked him if he had thought that he round be able to keep all his happy going night and day straight along through the month."
"Certainly," he replied. "That is a sample of the understanding some people have of the electric light."

2. An impression also prevails that as an electric lamp can be made to vield a light creatly in excess of the power of any gas jet, a few Edison lamps should suffice to take the place of at least twice as many gas humers. We can furnish launs of five degrees of power: 10, 16, 32, 50 and 100 candles, but our standard lamp here is the one of lowest brilliancy, to candles, which gives a light equal in Illuminating efficiency to that of a good average burner consuming five feet of Brockton gas an hour.

3. The running expense of the light can readily be computed by each enstomer from day to day. The policy of the company is to supply our light at the rate of gas at \$2.00 per 1,000 feet. This is exactly what we are now doing, furnishing a 10-candle lamp at 1 cent per hour, which would be the cost of a 5-foot burner, and a 16-canalle lump, at 1.6 cents, which is the price of two 4-foot lairners, or one argain at the same price per thousand.

We also call attention to the importance in making permanent electric light installations, and especially in wiring new buildings, of seeking competent advice as to the distribution of the light and the number of lamps

feets

5. Though permanent brings (retween flower of insidings, about) received and fatired sing is not water pipes must of necessity be regarder, and the adaption of old gas futures to electric received on the control of the properties of the properties of the control of the properties of the propertie

Yours very respectfully, W. J. TENKS, Manager."

PROGRESS OF THE EDISON LIGHT IN GERMANY. We take the following extracts from the London Electrician, Feb. (6th:

and the contenuity divides to from the Loudon-Garman, Feb. (100).

"The German Blanch Vaniguary have been found at a weak shongs of the Contenue of a blanch to the Loudon-Garman of the Loudon-Garman of the Loudon-Garman of the Contenue of the Loudon-Garman of the Contenue of the Loudon-Garman of Loudon-Garman o

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as one in his cap. They were connected to copper plates, in his heels, shuilar plates were let into the floor, and when the man connected his heel plates with these by standing on them, the lamps became incandescent, much to the automishment of the visitors to the exhibition, who could not make out where the current came from The company have wired several large buildings preparatory to introducing their system. Two of these are large cales and others private houses. They have also wheel their offices in the Leipziger Strasse. These they hope to light up when their central station is ready. They have lighted up the following organ factories in Germany, viz: - Gustrow (two, 120 light dynamos). Neustadt, Silesla jone, 130-light dynamo), Abrensbeck (one, 150-light dynamo), Gastrose tone, 120-light dynamo), Twilpstedt (one, 120 light dynamo), l'apenteich (one, 120 light dynamo). Rositr (one, 250 light dyname). The machines in these factories are kept running from 12 to 17 and 18 hours per day with their full load of lamps. The weolen tactory of Herr Noodi at Calle has been fatted with 120 lights, the saw mill of Herr Contacine at Rostock with Polights, the factory of Herr Hosiman at Neugersdorf with 25 lights, and the poteclain factory at Wallefangen with go lights. The company also have in hand a central nation at Berlin, the fitting of the steamship "Werra" for the North German Lloyd's with 300 Lungs; the fitting of a Chinese man ot was non-completing at Stettm with 300 lamps; this being the several man ofwar for the same Government fatted in a year; an installation of two lights on the powder factory at Spandau for the Prussna Government; an installation of techglus in a copper reling mill at Newstadt; an installation of policitis in a spinning null at Brauroweig, and an Installation of Golights in a mine near Hamon."

TESTIMONIAL FROM WESTERN NAIL CO., BELLEVILLE. The following letter has been received by the Western Edison Light

Company: "Bellavilla, ltt., Feb. 20th, 1884.

WINTERS Enson Lour Courasy, Chicago, Ill.

GFN (LEMS): - Replying to yours of February (8th, your system of electric light is giving us very satisfactory results.

We have now in me 220 lamps, eight canalle power cock, one lamp applied to each engine, latte, grind-tone, and mal nanchor, formishing ample light for the purpose required. It is rey difficult for to to arrive at the cost yer haut or day, for the excess that we draw our supply of steams much in running the dynamic four cut region lattery of bolies usupplying our factory engine. The entire applicance connected with the engine and dynamo, when and lamps, are shoply and each good proper and tamps, are shoply and each good proper and tamps.

fs.s.

Fours truly,
Western Nath Company,
W. H. Powell, President

TESTIMONIAL FROM YORK MANUFACTURING CO. We have received the following letter from the York Manufacturing Co., Saco, Maine, relating to the Edison plant in use at their mills:

"Other of VORK MASTFUTTERING Co., 4 SAO, Mr., Nov. 15th, 1585.

LOBON CO. FOR ISSUADED LEGITISC.

GENTIAMEN: In regard to the comony of your electric light in our mills, we have found, on trial, that its cost is test than oil-gas at \$1,00 per 1000 II. In our estimated cost, a fair interest on plant and allowante for dipercution were included. Of course it is needless to speak of its advant oges over gas in steadhers and all-horner of heart or yithded air.

Very truly yours, FRANKLIN NOURSE, Avent."

TESTIMONIAL. PHILADELPHIA. We have received the following letter from Messrs, Wolfenden, Shore & Co.:

"PRILADELPHIA, February 12th, 1884

EDISON CO. FOR ISOLATED LIGHTING,

GENTLEMEN 1: It gives my pleasure to say that both of the electric plants
you have supplied to our mill have given us very good satisfaction in every

Wolfenden, Shore & Co."

ANNUAL MERTINO OF PHE EDISION ELECTRIC ELLURI. NATING COMPANY OF NEW YORK CITY. DIRECTORS' REPORT. ELECTION OF OFFICERS. The bind annual meeting of the stackholders of this Company was held at Na. 65 Fifth Arwane, December 11th, 183. The following are the officers and directors for the ensuing year: President, (election postponed);

Vice President, S. R. Kalon; Treasurer, and Secretary pro Imn., F. S. Hastings; Directors: Thomas A. Edison, S. B. Eaton, J. F. de Navarro, Charles H. Coster, J. Hood Wright, G. P. Lowrey, Henry Villard, Erastus Wiman, C. T. Christensen, Spencer Trask, Francis R. Upton, F. S. Hastings, and Engene Crowdl. G. E. Chimoek, is continued as Superintendent of the First District.

The following is the Report of the Board of Directors submitted at the stockholders meeting:

"To the Stockholders of the Edison Electric Illuminating Company of New York City:—

Voir Band of Director denie to expres their congenitation upon the continued success of the motifation in the First Issust. Everyloy Box the High, the domaind for it far secreds the supply, the station is already taxed to the fallest express without teing all to to take all the customers that apply, and the mantiley receipts are in curses of the express. Thus the Pont Street Station, originally started Sperimer [16], the second most in six sixteents mount of continuous speciation, has demonstrated the practicalistics of the Eddion system

of crusted authors have great worse of the details of the installation in the Ferral Institute, recipiled in the less assumed report. Our company, as will be transmissered, is the course of two objecting buildings, particular for the crustation where the policies was started in loan gloss and office of the certail and the contract of the course of th

We are at reserve the blocking in the Trian Droute about 1900 looses, when the should are large of which 1,000 gree in actual too, that is to may, attached to the conductors, available at the will of the circumer. From the start, the number of customers has steadily increased mostly by month, as more fully appears by the following statement showing the number of customers and lamps at the legislating of each most divine the states of an started.

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N1 1481 I	t or	LAMES IN	LAMPS WINE
CONSUM	ERS.	USF.	IOR.
			1,
59 Custo	eners	1,254	1,626
и.		1.701	2,468
oj -		3,144	4.536
, .		3,477	5,328
12		4.133	6,161
			6,596
			2,521
6			5,451
	,		10.268
			10.160
	,		10.020
			11,192
			11,555
			12,732
,	,	10,297	12,1925
	59 Custo 94 93 95 96 96 96 96 96	03 33 221 56 56 56 56 57 58 58 59 50 51 52 53 54 55 56 57 58	Var. Var.

* the prawer for the difference between these figures and those in the 1,th Hollerin is that

The Editon merics furnish the data, in very care, from which conserved has reason of the Edit has a meric in this own premises, and his fall is made out and payment required upon what the meter above. This identifies it made that the sended in insight close attention from the merre, and his caused in his cassed in his cassed in his cassed in the decision of the de

ber of lamp hours by the given cost of a lamp per hour, to determine what the amount of the bill ought to be. Our charge for light in the First District is at the rate of 1 1-5 cents per lamp, per hom, consequently the products obtained by multiplying this price into the number of lamp hours shows what the consumer's bill for the light ought to be, and thus affords a complete check upon the accutacy of the meter measurements. There have been many cases during the year where, in order to satisfy rustomers that the meters were reliable, we have taken them out at the end of a given time during which the customer has kept an account of his lamp hours, and have presented bills made out on what the meters showed, in order that the customer might check the amount of the bill by the simple rule mentioned above. In all of these cases the accuracy of the meter has been maintained, and the confidence of the public has steadily increased, so that, at the present time, it can be safely said that the Edison meter, originally considered by some to be possibly the only doubtful part of the Edison system of central station lighting, is now generally admitted to be both scientifically and practically entirely exact and reliable.

But desirtless the best possible resis of the accuracy of the mater is whether me consumers part for idea. The rail flows the third fills of results on one what the metres show, howe it this par regularly subhort complising in good earliest rath the are sected with its course; or the metr. The locks of the company show that only is the acceptant that the vasturers gas iter life, the company show that only is the acceptant that the vasturers gas iter life, the company show that only is the acceptant that the other gas iteration, the mathrial possible produced and the most of the control of the control and allowing some consoners are desirable to make the control of the mathrial gas and the gas acceptance to the control of the control mathrial gas and the gas acceptance the control of the control of the mathrial gas and the gas acceptance to the control of the contr

to customers and the actual cash pays	uents thereon	
E .		;:
MONER	BRES BENDERED.	AMOUNT COLLECTED,
June, 1863	\$5.24 11	\$4, 341 28
July, 1853	4.530 89	5.553 10
August, 1883	4.(**) 45	5.179 17
September, 1883	5,062 30	4,501.49
October, 1883	7,071 59	5,725 65
November, 1883	10,084,40	9,102 45
44 -		

....

In explanation of the above statement mention should be made of the fact hat the "Bills Rendered" in any one month, in October for instance, are less than the amount of light sold in that mouth. If all the meters were changed on the same day in each month, and, more especially, if they were all changed on the last day of the month, the bills being all rendered on that day, the aggregate of these bills would correspond with the actual sale of light for that mouth But such is not the case. In order to enable one employee to take charge of all the meters, the total number of customers is divided into as many groups as there are working days in a mouth, and to each of these groups one day in a month is allotted. In this way a single employee can attend to all the meters. although he changes but a portion of them each day. If the consumption of light was about the same every mouth, this would make no difference as regards the "Bills Rendered," but inasmuch as the consumption varies greatly at certain times of the year, as in October, for instance, where there was a large Increase over September, and more than double the amount of light sold than in August. the gross monthly sales necessarily differ from the bills presented. The actual unt of light sold in October was \$10,293.98, and in November \$10,631.88 but, owing to this method of changing meters daily, and to the further fact that the larger part of the increase in October occurred in the latter part of the month more than half of the October sales appear in the November hills, and likewise at least one-half of the November sales will appear in the December bills

We are now reliesing to take more customers in the First District. All the lamps the station can safely supply are connected, and, although new applications for the light are often received, they have to be rejected. Some of the applicants thus rejected have left written applications for the light, with the understandring that they are to be supplied in turn as fast as there is any current to spare; and the number of these applicants now awaiting their turn, is 120. The underground conductors were proportioned to distribute the maximum current to be generated by the station when both buildings were fully equipped. But thus far only onehalf of its ultimate equipment, one building, has been installed. The fact that the supply of current is now exhausted by profitable consumption and that new customers are being refused, together with the other highly important fact that the expense of running the station when enlarged will bear but a small proportion to the increased receipts, compels an early enudderation of the question of increasing the current-supplying capacity. Mr. Edison is now experimenting to develop an increased capacity in the present dynamus, and his success will probably determine whether the desired increase of capacity in the station, required to provide for all possible customers, can be attained by mechanical changes in the present dynamos, or whether new and additional plant must be installed in the other building belonging to us, adjoining the present central station,

No power has yet been sold. Small motors are now being perfected. No large motors have yet been made, and even if they were completed, they could not be put into use until the capacity of the station is increased.

The light has now been in use in the First District for more than fifteen months, and sufficient experience has been gained to justify a correct upinlon as to its merits. We have made especial efforts to ascertain what the upinion of our customers is, and, both through our employers and through others who are unknown to the consumers, we have tried to ascertain how the light is liked, Everybody likes it. A large portion of our customers gu so far as tu say that rather than part with it and go back to gas they would pay us an increased price. should we ever demand it; and some go so far as to state that, no matter what the light might cost, they would not give it up. A reasonable conclusion derived from the experience of the past year is not only that our light is uniformly liked and preferred to gas, but that even if the present price of gas were largely reduced, it would not be necessary for us to make a corresponding reduction in order to retain our customers. We believe that at the present fair and satisfactory price we can retain our present customers, and can secure in the future all the additional new ones we may be able to supply from an enlarged station, even though the present price of gas should be largely reduced,

The history of the great achievement which this scientific and commercial success implies, it is gratifying to recall. In 1879 many of the tirst scientific men of Great Britain unanimously declared their disbetief, before a select committee of the British House of Commons, in the possibility of any subdivision of the electric light. At that very time Mr. Edison, who had already accomplished this subdivision in a way which he believed capable of economical application, was engaged in his laboratory upon the great and complex task which he had set for himself. That task was to devise and put in successful operation, commercially, a system by which electrical currents could be generated and distributed from a central place to all the buildings in a town or other given area, this current to be turned by the householder at with, without danger or inconvenience, into a light healthful and agreeable to the eye, in quantity suited to domestic habits and occessities, and for a price which the consumer would be able and willing to pay, and which would return a satisfactory profit to the investor. This undertaking, in all its conditions, demonstrating both the possibility and the economy of sub-lividing the electric light, has been accomplished. and our first central station in this city is now regularly lighting its district at a profit which will afford a reasonable return upon the large investment required for this original and somewhat experimental station, as well as demonstrate that adequate dividends can be permanently maintained and relied upon in other districts hereafter occupied. By the experience already gained, the outlay for future installations of a similar character will be greatly reduced, and the profits proportionally increased.

proportionancy intergrates. In the last annual report reference was made to the rules adopted by the Board of Underwriters for the wiring of buildings for electric lighting. These rules have been carefully compiled with, and the safety of unity light as regarded unity fire, but also danget to the person, has, we believe, been firmly established.

1535

libels to the entire satisfaction of the lineauses officials. The intelligent and reconsidiate maters which the Committee of the Bland of Universities and their representative having this especial matter in land have discharged their having the bland of the satisfaction of the lineau of the gardent aslowed by the satisfaction of the satisfaction of the satisfaction of having the satisfaction of the satisfaction of the satisfaction of the lineaus of the satisfaction of the satisfaction of the satisfaction of the lineaus of t

The installation of additional central stations, in the upper part of the city, has been considered by your board on several occasions iluring the year. Two different propositions for furnishing capital to make uptown installations have been communicated to us, but the judgment of your board was that neither ul them was lavorable enough to be adopted. Our polley has been to protpone the question of installing other central stations until the one now running shall have been in operation long enough to completely demonstrate the commercial possibilities of the business. This demonstration having now been made, the time has arrived to formulate a plan for securing the requisite capital to at once start one or more stutions in the upper part of the city. Preliminary canvasses and estimates have already been made, and, basing our opinion on the actual experience already had, we believe both of these proposed districts would pay satisfactory dividends upon the investment. We earnestly recommend your new board to give their earliest attention to this question of at once installing at least two large stations, one in what is known as the Madison Square district, and another in the lest residence district, somewhere between Thirty-lourth street ami Central Park.

Dolled streambn is now being turned in the ration methods of discriming the electrical corrects in the streets of large fields. Doublets better estelle narcose of our large system of underground combatons is this city during fifters and the contract of continuous methods of continuous methods better the public converties that extracts on the conversity for evergenced combatons, and that all electrical contracts are the contract of the contrac

pressure currents, is a striking conformation of the foresight manifested by Mr. Edison in perfecting his underground system.

In dening this report, your board would again express to the stockholders their congravitations over the princess of the lossiness shring the year. The problem of central station lighting on a large scale, in which we have no petitor, it solved. Our company controls the exclusive license for this valuable systems of lighting for all New York (five, the most prointials feel for efective) lighting in the country, and it move rests with your new board of directors to deview means for occupying this rich territory."

ANNUAL MEETINO OF THE HOLATED COMPANY.
DIRECTORS PROPRICT OFFICIARE RECETED DIVIDEND
DEGLARED. The second annual meeting of the stockholden of the
Edilson Company for Isolated Lighting was held November 20th,
1883 at the office of the Company, No. 65 Fish Avenue, New York
(107). The following are the offices and directors for the enouing
year; President, S. B. Eaton; Treasure, F. S. Hasting; Sectory,
J. Hutchinson; Directors; Thomas A. Eilong, S. H. Eaton, Eduzad
H. Johnson, C. H. Conter, Spencer Trask, J. C. Henderson, and
Anthony; J. Thomas

The directors declared, January 8th, 1884, a dividend of 4 percentum payable January 28th, 1884.

The following is the Report of the Board of Directors submitted at the stockholders meeting, November 20th:

" To the Stockholders of the Edison Company for Isolated Lighting:-

This company has now been in existence two years, and your bonds are of the technical details connected with it, and the effectiveness of lise between the preferring of the technical details connected with it, and the effectiveness of lise executive and considerable conjugation are all subjects to recognizations. Two years age the considerable conjugation are all subjects to recognizations, two years age the experimental confusion of the property of the prop

The leaders of the company for the past year up to November 19th, has nonnetice to 3% installations of lookaled plans aggreening 2, 353 palms. The summer of the past of the past of the past of the past of the \$57, with an aggreenic of 2,1245 imps. The total lookaces of the companterior of the past of the contract, aggreening 2,134 imps. The total lookaces of the compantion of the past of the past of the contract, aggreening 2,134 imps. The past of the past of the contract of the past of th

	Hate	Number of plants sold.	Aggregate number of lamps.	Average sumber lamps per plant
ch.	1, 1882	36	4,122	142
nly	l. "	. in	10,168	150
ĸı,		123	21,499	
Inc.		153	29,192	191
kt.	1, 1883	221	53,071	249
ov,	19. "	275	55.765	201

-----Steamship lighting, although surrounded with peculiar difficulties, is a valualde adjunct to the company's business. Our large idant in the steamer l'ilerim. Fall River Line, finished since the last annual meeting, well illustrates our success in this class of installations. Among the steamboats now lighted by our isolated plants are the following, viz., the Kute Adams, Little Rock, Ark., 120 lamps; Mr. James Gordon Bennett's yacht, Namouna, 120 lamps; the steamers Carolina and Pirginia, Baltimore, 120 lamps each; the Pilgrim, Fall River, 110 lumps; Mr. Jay Gould's yacht Atalanta, 116 lamps; the City of Westerler, New London, Conn., 300 Jamps; the Kalama, Northern Pacific Railroad Comjerny, 60 lamps; the steamships Columbia, 120 lamps, Queen of the Pacific, 250 lamps, Alaskian, 300 lamps, and Olympia, 300 lamps, all belonging to the Oregon Railway and Navigation Company; the steamships Alemoia, 210 lamps, Marifora, 150 lamps, and Kinau. 100 lamps, all belonging to the Oceanic Steamship Company; the United States Fish Commission steamer, Albatron, 130 lamps; the Trenton, U. S. Navy, 150 lamps; and the ferrylecuts Funtrood and Central, 60 imps each, belonging to the Central Railroad Company of

New Jersey,

The lighting of newspaper offices is proving to be one of the best known branches of our business. At present our isolated plants are in use in the followtion.

ling offices, viv., the Haltumer Sun, the Boston Advertiser, the New York Hersild, the Philadelphia Leifer, the Davenport Gazette, the Tomato Mail, the Ohie State formand, Columbus, the Boston Heads, the Philadelphia Record, the Urica Handd, the Pixtology Trace, the Bullimore Heads, the Albary Daily Peru and Kavitack der, and the NewHead Balget and Tray Theyesia.

Reference was make in the Lea amount report to the lighting of the flare made up to two the spin closest days and restrict states of the light to the property of the lighting above in our binders on Valley Flatts. As the Control Station braids and the light states of the Control Station braids with the light states of the light and valleyers where two gooding both of that the day state underties, would be possibly one report on the restrict the possible conductors. Send the provide one proposes in a sorter north the possible conductors of this large strength in the providence of the large strength of the light in valleyers. The large state of the large strength is the providence of the large state of the large strength of the large state of the

These village systems, the correst being distributed overground by means of pole lines, have proved enterity successful, and that branch of the Company's business is just beginning to be rapedly developed. This first installation of this kind was an experimental one, at Roselle, N. L. o. monogus, town, made at the joint expense of this compony and the Edwar Electric Light Company. The plant was started last February, and has been in constant operation ever since, light being sold by meter measurement to used of the residences, and the streets lighted. Since that plant was installed the light Company has made several other successful installations of these village plants, and, as a result of the success thus achieved, an acrive demand is now springing up for this system of artificial illumination. Thus far the demend has come principally from gas towns, but your board clearly see that during the corning year, as soon as these village plants are more generally introduced and understood, which is now being rapidly accomplished, a large demand will spring up also from non-gas towns. Under the contract between this company and the Edison Electric Light Company we control the introduction of the Edison electric light in all places where there are on gas companies; accordingly all such towns desiring village plants must analy to our company for a lirense. Within the just week a contract has been closed with one town of this description, Mount Carnel, Pa., which, being a non-gas town, has taken a license from, and pays a resulte to this company. Our college in developing this branch of the business is to induce local householders who may become customers and use the light, to become subscribers to the stock of the local company. The Light Company stactors the same policy. It has already been successfully inaugurated in several towns, and the success already accomplished indirates that during the coming year others of these companies

Our company has thus far parted with but little of its territory, still retaining neatly all that was originally secured by it from The Edison Electric Light Company. It may be of interest to state here just what this territory comprises. It is clearly set forth in the original contract between the Light Company and ourselves, viz. All those portions of the United States and tetritories thereof which, on the first day of Londary, 1952, were included within the munierpol limits of any town, city, village or other territorial municipality, wherein illuminating gas was not, or had not been, prior to that time, supplied for purposes of lighting to more than ten customers or consumers. In other words, our Company acquired all territory outrale of gas limits. On the question of disposing of or selling out this territory, your present bound have pursued the same general and conservative policy of the former Isoard, and have deemed it less not to part with large areas of territory, certainly not until the business is more fully developed, and its real value more definitely known.

The last annual report called attention to the then existing necessity for increased capital. At that time the capital of the company was \$500,000, of which 51 one-leadhealths had been issued to the Edison Electric Light Company on account of a license, and the balonic has been sold at put for each, to take money for carrying on the business. This amount of cash, however, had been bound to be inadequate. Consequently, the necessity for increased capital having first been explained to the satisfaction of your loand, the stockholders authorired an increase to \$1,000,000, at a stockholders meeting held. December 30th, tasia Of this increase, 51 one-hundredths was issued to the Light Company, pursuant to the original contract, and of the lealance of the increase only onehalf, 50 per centum, of the par value, has as yet been called in. While the present each capital is sufficient for the present requirements of the lorsiness, It is not enough to admit of all the orders being taken upon which good profits our be corect). This is especially true of one class of transactions, vir., lighting theatresand public louidings for a continuing compensation, by means of isolated plants owned and operated by this company. Several contracts of this sort, upon which great annual profits rould be earned, have already been rejected by us, because they required the permanent investment of large sums, for which our capital was inadequate. The question of taking up this class of business and of calling in the unpaid instalments on the stock to furnish the requisite capital. will probably be one of the questions to be considered by your new board.

Regarding the more important details of the company's business, but little change has been made since the last annual meeting. The affairs of the company are still managed at the home office in New York City, local agents being employed throughout the country to solicit orders, and, except in most of New England and in the territory controlled by the Chicago company, viz., Illmois, feest

lowa and Wisconsin, the installations are made from here. The established policy of conducting the business or a strictly one-price basis has been continued shiring the year. Some raders have been lost in consequence of adhering to this tule, but your board are strongly of the opinion that, on the schole, the business has been benefited by a rigid adherence to the one-price principle

Everybesly likes the Edison light and our method of installing it. Everywhere entire satisfaction is given by our plants. A large number of testimonials, relating both to the economy of our plants and the superiority of the light, have been received from our customers. They are altogether too manerous to be recited here, but most of them have been printed from time to time in the Bulletins, where doubtless our stockholders have seen them. But perhaps the lest evidence of the satisfaction given by our plants is the fact that not a single one has ever been rejected on account of eitherseconomy, reliability or eniciency. On the other hand, many plants have been largely marcosol, after trial -a fact of peculiar interest as showing what our instoners think of the light. There have been twents-four increases of this kind, with an increase in the number of lamps from 3,275 to 8,165 lamps.

A noteworthy feature in the development of the business during the year is the income derived from lamp renewals. Every isolated plant consumes lamps, and a profit accrues to our company in supplying new ones. As our business grows and the aggregate number of lamps used in isolated plants increases, the supplying of new lamps becomes an important item

The annual meeting of the stockholders is now held, pursuant to the hydrox of the company, "on the third Tuesday in November in each year," Our company was originally formed in the mouth of November, 1381, and the by-laws were adopted and the officers elected also in that mouth, which accounts for this date having been selected for the annual meeting. Experience has already shown that this date is an inconsenient and inappropriate one. Our main business, especially the selling of isolated plants, is done in the autumn, hence the annual meeting now takes place in the middle of the busiest part of the year. Not only is it difficult for the treasurer at that time to make up his annual statement, but, whenever it may be found processing to change the others of the company, the middle of the busy season will be likely to be an inopportune moment to do it. Consequently your board are of opinion that the time for the annual meeting should be changed, and the meeting take place in the dull season of the year, either in May or June. This is a matter which can be determined by the Board of Trustees, without any special action on the part of the stockholders; but inasmuch as a change of the date for holding the annual meeting might affect the time of declaring dividents, the subject may very properly be considered and acted upon by the shareholders at the present annual meeting.

An examination of the brancial combition of the company, as shown by the Treasurer's Report submitted to the meeting herewith, shows that the finances of the company are in good condition. Whether it will be necessary to call in the

Although the volume of business the past year would probably have been larger, were it not for the fact that factories, our largest customers, base not made money, and have therefore not been willing to make large investments in rbetric light, nevertheless the growth of our business has been steady, as appears from the table submitted above. There appears to be no reason to doubt that this growth will be hereafter maintained, and that the business of the company may now be considered as established on a paying toxis. The accomplishment of this result within a short period of two years, considering that the enterprise was entirely novel and interly without precident, is, in the judgment of your board, a cause for congratulation."

DEATHS FROM GAS. The following 22 recent deaths from illuminating gas have not been previously published in the Bulletin :

Near or Discourse. Where Discour Decisions. Cutar or Discour. Date Md..... 1 17 Dora Christenson Checago, Illa. Francis W. Martin Surblin's Hotel, Usica, N. Y. Nov. 1 . . Dr. 3 ********* Horse Elizand Lackanina floor's Scranton. . John J. Pulver..... tisult House, Chicago. * 144 Wallace Brookman Ashland House, Lexington ... Feb 15 Richard Craig.... George Hall...... Nigth River Hotel, N. Y. C.-··· Frank's Boot, N. Y. C..... Mch. E. H. Gerster..... Palmer House, Chicago.... 5.75 tue

the gas lights at West Brighton Beach, Coney Island, went out. An accident had happened to the holder which could not be repaired umler 24 hours * * * On August 24th a fire in the show window of Louis Albenberg's store at St. Paul was caused by goods coming in contact with a lighted gas jet. The contents of the window were destroyed and the plate glass broken. * * * Gas escaping from a main at Church Street, Toronto, August 31st, exploded, shaking the earth for some distance and injuring two men. * * * On September 19th, a fire occurred in the gas works at Keene, N. II. caused by an explosion of gas. A workman was injured, and the property was damaged to the extent of about \$1,...co. * * * A setions explosion of gas occurred at the Prefecture of Police, Boulevard du Paiais, Paris, on September 30th. The earth was torn open and paving stones hurled to the third store windows. A policeman on duty at the gate was picked up in a dving condition, and three other persons were seriously injured, two of them, it was feared, fatally. . . . Escaping gas filled a street lamp at Shamokin, Pa., October 29th, and exploded when the lamp was lighted. The ignited gas can down the post and under the pavement, which was tom up. * * * On November 11th a window curtain caught fire from a gas jet in the house of E. W. Levering, Baltimore, causing a lite which destroyed the building. * * * An explosion of gas occurred in one of the buildings of the gas company at Halifax N. S. on November (6th, causing much damage. * * * On November 17th a man named Kelly was asphyxiated in New York City by gas while making a joint between a building and the supply mains of the Gas Company, * * * A man a med Poster took a naked light to find a gas leak at Jersey City, November 20th. An explosion occurred by which Foster was loully burned, and damage done to

property. * * * Escaping gas at the Union Club House, Chicago,

forced out of their frames and the store partially unroofed. Mr. Whiteomb was severely injured, sustaining a compound fracture of the right leg and other injuries. His clerk was also injured. * * * On December 24th, Sanford Sheridan and George Smith were found unconscious in bed at the Van Dyke House, New York City, the room being filled with illuminating gas * * * A leaky gas pape in a restaurant in Butlato, caused an explosion, December 27th, whereby four persons were badly injured and the building and contents damagen. Loss \$9 0.0. . . On December 30th, Charles Neiman, Baltimore, was found insensible in his room, which was filled with escaping gas. * * * In December last an explosion of gas occurred at Putsburg, Pa., whereby the stable of Schoeneberger & Co., was wrecked and four valuable houses and 1000 nodes were killed. The loss was estimated at \$10,000. * * * Christine Keiswurm was found unconscious in hed at 215 Canal Street, New York City, January 6th, the room being filled with gas escaping from an milighted burner. * * * Charles Kuhn was found unconscious in his room at the Van Dyke House, New York City, January 9th, the gas being turned on but not lighted. . . . A terrific gas explosion occurred in the building Nos. 157 to 161 Hanover Street, Buston, January 18th, whereby the whole structure was demotished, and adjoining property damaged. Two men were seriously injured by fathing walls. A fire followed the explosion. The shock was felt for many blocks, and much damage was done to property in adjoining blocks. The damage was upwards of \$61,000. * * * A young woman named Hansen, was found unconscious in her room at a hotel in Waterbury, Conn. January 29th, having blown out the gas when she retired the previous right. * * * A gas pipe which ran under a railway bridge at Springfield, Mass, burst on January 30th, and the sparks from a passing engine ignited the gas, setting fire to the bridge. * * * On February 14th the gas in some

portions of Baltimore was cut off, owing to accumulation of water in the mains. Many street lamps could not be lighted, and storekeepers had to resort to candles and lamps. • • • Levi Gottschalk was found unconscious in his room at Baltimore, February 14th, the room being filled with gas escaping from two unlighted burners. . . . A terrific explosion occurred in the vault of the Bank of Commerce at Toronto, Canada, on February 25th, caused by escaping gas. George Shaw, a messenger, was thrown a distance of twenty feet, and severely injured, twelve clerks where thrown down, and the paying teller was thrown through the window into the road, the iron doors of the vault were almost twisted off the hinges, and other damage was done. The damage was estimated at about \$5,000. * * * An explosion of escaping gas occurred in the office of J. Harmanus Fisher & Sons, Baltimore, by which one man was injured and some property damaged. * * * Patrick Magher, an employee of the Waterbury (Conn.) Gas Co., was overcome by escaping gas while removing a gas meter. * * * Carl Witte, Henry Gilsick and · Herman Leinester, were found unconscious in the room occupied by them at the College Place Hotel, New York City, March 11th, having been asphyxiated by escaping gas. They were removed to the hospital! * * * An explosion of gas in Hollender's restaurant, New York City, about March 12th, injured two men and caused damage to the amount of \$500,

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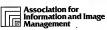
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